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the OIL AND GAS JOURNAL

ECEMBER 10
1942

PRICE
CENTS

For the Duration—

Winning the war is EVERYONE'S *only business.*

●

Production at home lays the foundation for Victories abroad.

●

Your war job is important, or it wouldn't exist. The more you contribute to it, the more important it becomes.

●

When you find a better way to do a job, tell others. The speed up of production is largely due to *individual* thinking.

●

Boost your department, your plant, your America. By doing so, You boost American fighters.

●

Make the most of what you have. Unnecessary consumption of civilian goods slows war production.

●

Count ten before answering an inquisitive stranger.

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HERE'S OUR ANSWER:
If you doubt the value of the scrap material now uselessly lying around just remember this: All steel is made with scrap. Without scrap we could not have manufactured the giant pressure vessel essential for producing 100 octane gasoline. America badly needs your scrap now!
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BAKER OIL TOOLS, INC.

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19 Rector Street, New York, N. Y.

General Heading: **BAKER WALL SCRAPER AND BAKER WALL SAMPLER**

Unit No. **A-14**

Subject: **A Safe, Economical Solution to Hole Enlarging, Wall Scraping and Wall Sampling Problems.**

Index: 250.1
Date: December 10, 1942
Page: 1 of 1 p.

There are a great many drilling, well repair and well completion operations wherein enlargement of the bore of the hole or scraping the face of the formation, is either desirable or necessary. In addition, there is the popular practice of *removing sections of drillable pipe to serve as windows for producing zones. For such applications, operators have come to depend upon the safety and performance of the Baker Rotary Wall Scraper. The important safety and savings features of this tool, together with application details, are given below:

REMARKABLE REAMING CAPACITY

The Baker Wall Scraper provides a means of enlarging the walls of an open hole to a diameter considerably greater than that of the casing or hole through which the tool is run. The reaming capacity of this tool in relation to its O.D. is really remarkable, having a maximum expansion range on the Blades of from 4" to 36". For example, the No. 6 Scraper will run through 9⅝" A.P.I. casing and then ream from a minimum of 9¼" to a maximum of 19".

SAFETY

The design and operation of this tool minimizes any hazard of sticking it in the hole. That means there is little danger of a costly fishing job and possible loss of precious drill pipe. The safety and performance of the Baker Wall Scraper has been ably demonstrated in many thousands of successful runs.

SIMPLY CONSTRUCTED, EASY TO OPERATE

The Baker Wall Scraper is constructed of a minimum number of essential parts, with an operating principle so simple that there is little to get out of order . . . that means no loss of expensive rig time due to failure of the tool to properly function. Any experienced driller can secure successful first-time results with this "easy-to-operate" device.

TWO TOOLS IN ONE

The Baker Wall Scraper is really "two tools in one," since by merely substituting Sampler Blades for the regular Scraper Blades, converts the tool into a Baker Wall Sampler. With this device, it is possible to take actual cores from the side walls of any uncased hole at any depth. The percentage of core recovery is high and cores are all of a size adequate for accurate laboratory analysis.

HERE IS DOUBLE VALUE FOR YOUR MONEY . . . TWO EFFICIENT TOOLS FOR THE PRICE OF ONE

TIME AND MONEY-SAVING APPLICATIONS

Several practical applications for the Baker Wall Scraper are illustrated in Figs. 3 to 6. Others are listed below. Note particularly the ability of the tool to remove sections of drillable pipe to serve as windows for producing zones.

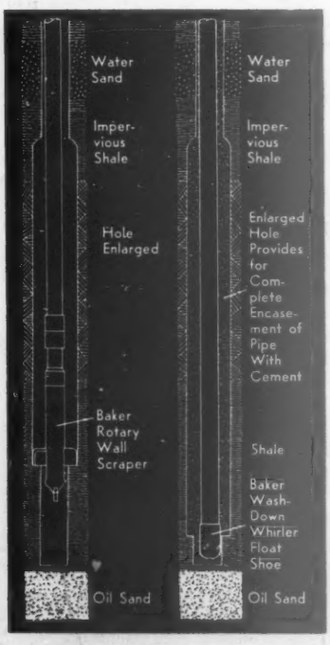
- Enlarging Holes for Casing
- Cleaning Up Oil Sands
- Setting Liners
- Setting Cement Plugs
- Bottlenecking for Cement Jobs
- ***REMOVING SECTIONS OF DRILLABLE PIPE**
- Water Shut-Off Tests
- Sidetracking
- Straightening Holes
- Fishing Jobs
- Enlarging Holes for Gravel Packing
- Side Wall Sampling (by converting Scraper into Baker Wall Sampler)

Service Note

Competent Baker men will service, make suggestions, and otherwise assist in securing best possible results.

Fig. 1
Product No. 500
Baker Rotary Wall Scraper

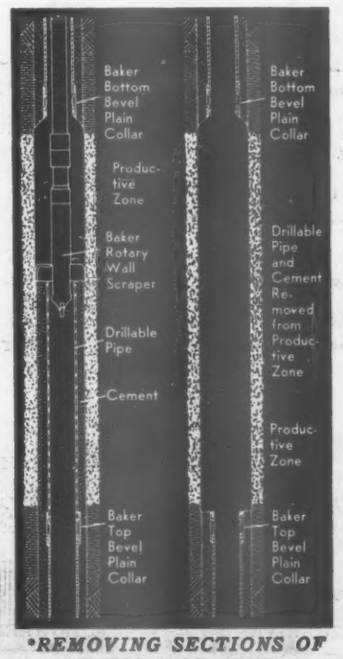
Fig. 2
Product No. 502
Baker Rotary Wall Sampler



BOTTLENECKING THE HOLE FOR BETTER CEMENTING

Fig. 3—Showing use of Baker Wall Scraper to enlarge hole for bottlenecking job. *Fig. 4—Showing how bottleneck permits uniform body of cement at Shoe joint.*

For complete details concerning the design, construction and operation of the Baker Wall Scraper and Baker Wall Sampler, see pages 279 to 287 of the 1942 Baker, or Composite Catalog. Also send for 40-page, illustrated treatise, describing in detail various applications for this tool.

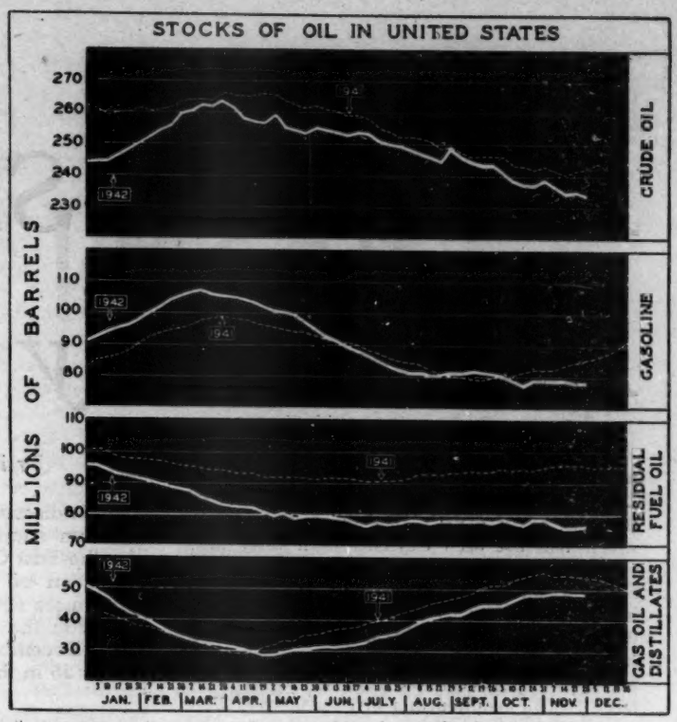


****REMOVING SECTIONS OF DRILLABLE PIPE***

Fig. 5—Showing Wall Scraper removing section of drillable pipe and cement behind the pipe. *Fig. 6—Showing drillable pipe removed, the formation scraped and zone ready for production.*

Trends

First Year of War Gives Oil Industry Picture of Future



IF there was any fat on the petroleum industry when Pearl Harbor was attacked, it had been completely stripped off when this country started its second year of war Tuesday. War obligations of the petroleum industry are now fairly clear. Less positive, however, is the industry's confidence in its ability to supply all requirements because of government policies regarding materials, prices, and related influences.

CRUDE PRODUCTION *3,841,845 bbl. daily average — down 45,380 bbl. One year ago 4,103,715 bbl.*

CRUDE STOCKS *234,850,000 bbl. as of Nov. 28—down 455,000 bbl. One year ago 242,884,000 bbl.*

GASOLINE STOCKS *78,854,000 bbl. as of Nov. 28—up 271,000 bbl. One year ago 86,889,000 bbl.*

RESIDUAL FUEL-OIL STOCKS *77,796,000 bbl. as of Nov. 28—up 17,000 bbl. One year ago 94,817,000 bbl.*

GAS OIL AND DISTILLATES *49,739,000 bbl. as of Nov. 28—up 198,000 bbl. One year ago 55,251,000 bbl.*

REFINERY RUNS *3,736,000 bbl. daily week ended Nov. 28—up 14,000 bbl. One year ago 4,145,000 bbl.*

Note: Refinery-stock report delayed.

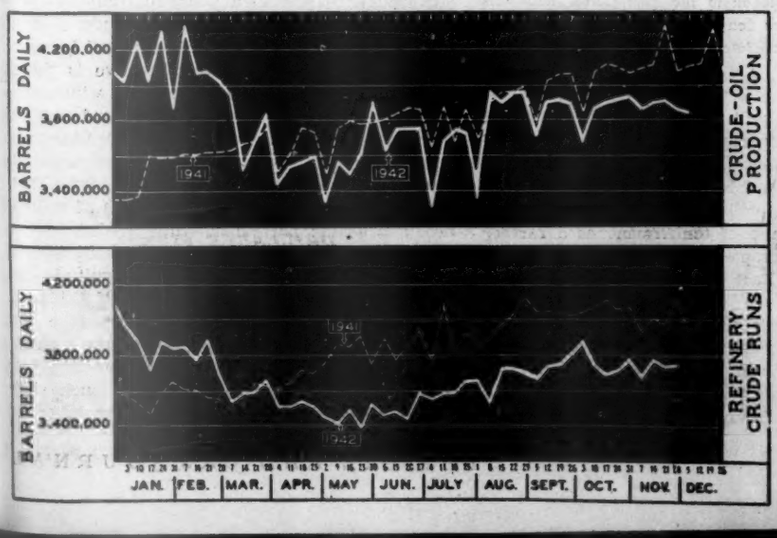
Current production of nearly 3,900,000 bbl. daily, drawn from some of the less substantial reserves because of transportation exigencies, is down 125,000 to 150,000 bbl. from the comparable period a year ago. Drilling operations are off about 50 per cent. But upturns in practically all phases of operations are in prospect if this country is to fuel the thousands of planes, tanks, and ships which are now reaching peak production.

While the industry was being shorn of its "fat," sacrificing consumption of steel, giving up tankers, and adjusting operations to alternate means of transportation, war production forged ahead. The days of bringing the fuel supply up to balance with the machines built to consume oil are near and adjustments must be made. Just how Government will accomplish the inevitable necessity of increasing current and long-range production is obscure. But the need is none the less urgent and it would be unthinkable, oil men declare, to project operations on any plane except one that will insure supplies in the quantities required by total war.

A review of the war-instrument production on the anniversary of Pearl Harbor amplifies the fuel task ahead of the oil industry. During the current calendar year production will approximate: 49,000 planes, 32,000 tanks and self-propelled artillery; 17,000 antiaircraft guns larger than 20 mm., and 8,200,000 tons of merchant shipping. This tally excludes naval vessels and the thousands of civilian vehicles contributing vital service to the war.

DAILY AVERAGE PRODUCTION FOR WEEK

	Dec. 5 crude oil	Dec. OPC quota all oils	Nov. 28 crude oil
Arkansas	74,000	77,300	13,600
California	714,250	815,000	735,250
Colorado	6,740	7,000	6,640
Eastern fields	90,300	107,600	94,000
Illinois	247,000	274,100	254,000
Indiana	16,300	17,700	17,000
Kansas	285,950	300,700	299,100
Louisiana	316,450	326,100	325,400
North Louisiana	*92,750*	.....	*96,600*
Louisiana Gulf Coast	*223,700*	.....	*228,800*
Michigan	59,100	63,800	58,400
Mississippi	62,500	50,000	61,000
Montana	24,265	24,700	21,665
Nebraska	3,000	3,400	3,100
New Mexico	101,440	99,700	101,460
Oklahoma	363,950	403,900	365,500
Texas	1,380,825	1,350,400	1,376,700
East Texas	*357,500*	.....	*354,800*
West Texas	*208,900*	.....	*212,600*
North Central Texas	*135,550*	.....	*137,600*
East Central Texas	*99,600*	.....	*95,500*
Texas Panhandle	*92,200*	.....	*89,800*
Texas Gulf Coast	*416,075*	.....	*416,000*
Southwest Texas	*71,000*	.....	*70,400*
Wyoming	95,775	94,500	94,410
Total United States	3,841,845	4,015,900	3,887,225
Total production, January 1-December 5, 1942			1,291,351,490 bbl.
Same period last year			1,293,037,590 bbl.



This week's economic report submitted to the Petroleum Industry War Council, forecasting requirements for more than 4,600,000 bbl. of crude oil and other hydrocarbon products in the final quarter of next year outlines the job cut out for oil men. Part of the increased demand, oil men agree, must be met from storage. But the heavy reliance that must be placed on aboveground reserves merely emphasizes the importance of finding more crude, building the plants for converting it into war products, and expanding transportation to deliver the materials where needed.

East Coast Supply Crisis Is Hastened by African Front

By J. P. O'DONNELL

This discussion of changes in the petroleum supply and demand outlook for the East Coast gives a broad interpretation of the situation and ties in with more specific detail disclosed this week in the PIWC economic committee's December report which starts on Page 25 in this issue.

NEW YORK.—Two recent developments have so intensified the shortage of supplies for the East Coast district that the critical period which had not been expected until early next year now appears to be imminent. Stocks of the major products, gasoline and fuel oil, are estimated to be 35 to 40 per cent lower now than they were a year ago and are being withdrawn from storage though normally they are built up at least to the first of the year to withstand the large fuel-oil requirements of January and February. Heavy fuel oil, required for industry and as fuel for ships, is so tight that it is expected to become necessary to use heating oil for this purpose. This will put an additional restriction on domestic consumers. Kerosene, used on a very large scale throughout New England for home heating, is virtually exhausted in that area.

Part of the War Emergency Pipelines, Inc., system, now approved for completion to the East Coast, will start operation in January. Here 16-in. pipe for one of the two feeder systems at the Longview, Tex., terminal is being laid by the contractor, Williams Brothers Corp. One feeder line will handle crude and the other No. 2 heating oil

Effect of African Operations

Developments which have advanced the critical period are the supplying of United Nations' forces in Africa from the East Coast and the failure of rail shipments to reach anticipated levels. Full effect of the first development cannot be gaged since the volume of these shipments is obviously a military secret. Equally obvious is the desirability of using the East Coast as a source of supply for North African operations. The only alternative would be the Gulf Coast and the distance between Gulf ports and Gibraltar is approximately 50 per cent greater than the distance between East Coast ports and Gibraltar.

The one known effect of this action is that it will reduce to some extent the volume of products available to consumers on the East Coast.

Another possible effect of the North African operation is that it will require the withdrawal of more of the tanker capacity now engaged in supplying the East Coast. Previously the tanker capacity of the United Nations was stretched very thin so that the opening of another front which will require the use of tankers means a further spreading of this capacity and it is reasonable to assume that the East Coast will be affected proportionately.

Inability of tank-car shipments to reach predicted levels is expected to result in a deficit of 12,800,000 bbl. between actual deliveries and anticipated shipments to District 1 in the last quarter of the year. Basing its estimates on reports of committees concerned with tank-car shipments, the PIWC committee on economics at one time concluded that they would reach 900,000 bbl. per day in October, 950,000 in November, and fall to 900,000 bbl. in December. Had these estimates been realized, the total shipments would have been 84,300,000 bbl.

Actually they have averaged 776,243 bbl. in the 9 weeks ended November 28 and are now expected to average no more than 750,000 bbl. per day in December. As the result actual deliveries for October and November plus the now-expected deliveries for December will probably total about 71,500,000 bbl., a deficit of 15 per cent.

One of the factors contributing to the failure to raise tank-car shipments to expectations is the inability of the railroads to maintain schedules which they had proposed and upon which estimates of deliveries were based. In very few instances do shipments arrive according to schedule and normally they run from 30 minutes to 50 hours late. The importance of this is apparent from the fact that if a bulk shipment, scheduled to make the trip from Texas to New York in 5 days, is 24 hours late, it means a 20 per cent increase in elapsed time or a proportionate decrease in efficiency.

Another contributing factor is the long time required to return cars to loading points. Frequently more than 10 days are needed to return a car to the point of supply though the same car may have made the trip from the point of supply to the point of discharge in 5 days. If the empty cars were returned in the same time that they made the trip loaded, their efficiency would thereby be increased 33 per cent.

Advent of Cold Weather

Arrival of cold weather was a third contributing factor. It was accompanied by more difficult operating conditions than were experienced last September when shipments reached their peak of 856,710 bbl. per day and, over a 4-week period, averaged almost 840,000 bbl. per day.

Considerable progress has been made in accordance with Directive 59 though it will not accomplish the aims predicted for it when it was issued. In the first place crude oil was already being brought to the East Coast in train-load lots called for by the directive. Since crude oil represents from 40 to 45 per cent of all oil brought in by rail, the effect of the directive is therefore limited to the 55 to 60 per cent which represents refined products. The train-load method was applied first to crude oil since there are many more points where 13,500 bbl. of crude oil could be loaded into a 60-car train daily than there are sources of similar quantities of refined products of the particular types needed.

There are only about 10 points where refined products loads of this or greater magnitude can be supplied. These are the large Gulf Coast refineries and a couple in the Midwest. It is the object to deliver bulk shipments from a single origin to a single destination. There are few East Coast terminals capable of handling such shipments efficiently but steps are being taken to

accommodate them. Largest of the new terminals now being built is the $1,000,000 unit at Linden, N. J., being erected jointly by Standard Oil Co. of New Jersey and the Pennsylvania Railroad. This terminal will be able to handle 100 cars simultaneously or 500 cars a day. It also includes marine facilities so that both tank-truck and barge deliveries may be made from it.

Water transportation suffered a setback when the New York Barge Canal, reported to be bringing in 75,000 bbl. per day, froze early this month. This loss is offset to some extent by the reversal of the Tuscarora line and increasing the capacity of Southern and Tide Water lines. Current pipeline and barge transportation into District 1 is now estimated to be around 200,000 bbl. per day. Including the tank-car volume, the total non-tanker deliveries which are the only assured supplies, amount to possibly 1,000,000 bbl. per day.

Supplies Off 40 Per Cent

This total is only 60 per cent of the demand for oil in District 1 during the six winter months of 1941-42. When it is considered that some of this is going abroad for military consumption, and that the demands of war industries, shipping, and utilities must be supplied in full it is obvious that other consumption must be reduced further.

It appears that much of the saving will necessarily be effected in fuel oil. Attempts will be made to eliminate all nonessential gasoline consumption though possibilities of large savings are regarded as small. In normal times, motor-car passenger mileage is about 10 times that of both railroads and railways and this vital function has already been drastically curtailed by gasoline rationing. Rationing has reduced heating-oil consumption to about two-thirds of normal and a cut to 50 per cent may be necessary. A plan of allocating supplies to essential consumers, first proposed 11 months ago, is now being urged.

The conversion program has been successful in industry but less than 5 per cent of the domestic consumers who could convert have done so. Failure of domestic consumers to cooperate fully is laid to the varying statements of officials on the seriousness of the situation which have cause confusion and disbelief in the public mind. This state has developed principally as a result of the censorship of statistics which formerly gave a clear picture of the supply situation on the East Coast.

●

Negotiations Resumed For Sending Supplies To Argentina

Negotiations were resumed last week, according to reports from Buenos Aires, between a commission from the United States and Argentine representatives whereby the latter government would be supplied petroleum equipment. Shipment of petroleum supplies from the United States is contingent on Argentina's acceptance of membership in the United Nations' oil pool, it was reported.

Argentina is being asked to assume obligation of supplying minimum petroleum requirements in Uruguay and Paraguay and, if the commitment is made, the United States will arrange for supplies of drilling equipment.

Negotiations between the two governments were started in September but were discontinued temporarily when it developed that Argentine domestic consumption would have to be reduced in order to supply part of its production to the two neighboring countries.

This Week...

ADMINISTRATION.—Long awaited executive order issued from White House, gives Secretary Ickes new title of Petroleum Administrator for War, changes OPC to PAW, effective December 17, fails to delegate all the powers advocated by industry. Order conveys authority to juggle sources and volume of production, dictate refinery runs, determine total supplies available for rationing. Otherwise, oil administration virtually unchanged. Most disappointing was failure to assign greater voice in price policies, material allocations. Recommendations and directives now have force of executive orders. . . . Subcommittees designated in five districts for planning joint use of all petroleum facilities. But, no specific action recommended, committees uninstructed on definite duties. All official utterances point to ultimate pooling, probably of all adaptable facilities. . . .

REFINING.—Drive intensified to shut down eastern refineries whose products are exclusively civilian. Reduced crude-transportation requirements would raise product deliveries, not in direct ratio, but to some extent. . . . Rubber Director Jeffers complains that diversion of steel to 100-octane gasoline plants is slowing down butadiene program, wants relief to assure scheduled completion of rubber-production facilities. . . . Nazis reported moving all French refineries, except one, to the Crimea, need 80,000,000 bbl. of gasoline in next 6 months, European informants declare. . . .

TRANSPORTATION.—Crisis developing prematurely in East Coast supply situation, because of withdrawals for African campaign. East Coast supply bases are 50 per cent nearer Africa than Gulf ports. . . . Rails moved 778,852 bbl. daily, week ended November 28, up slightly still short of anticipations. . . . ODT issues order requiring tank-car repairs at shops nearest breakdowns to increase avarage number in service. . . . Oil companies, railroads cooperating on building larger terminals, to speed turnaround. . . . Newest calculations of PIWC committee on economics projects eastern supply on complete withdrawal of tankers. . . . Coastal refineries hear unconfirmed reports that coastwise tankers will be increased. . . .

MARKETS.—Contract shipments continue at prerationed level, at unchanged prices. Spot buying in lull, pending more conclusive information on demand. . . . Calls for fuel oil particularly brisk. . . . Kerosene stocks exhausted at some New England points. . . .

RATIONING.—Easterners predicting cut of ration-coupon value there to 2 gal. weekly, 3 gal. in other parts of country. . . . States having adequate supply continue protests. . . . Salesmen granted relief, to receive supplemental mileage.

PRIORITIES.—WPB issues Preference Rating P-98-c, gives approval to intraindustry sales of new or used equipment, exempts such special sales from Priority Regulation 13. . . . Controlled Materials Plan being whipped into final form, field representatives explaining details at numerous centers. . . .

RUBBER.—One new plant going into production in Kentucky, another authorized in same state. . . . Small percentage of tires turned in as requisite to ration cards usable in present form. . . . Drivers needing rubber, however, are receiving more liberal treatment at hands of local boards. . . .

International News.

Here's evidence why eastern petroleum supplies are growing more acute. These tank trucks and motor transports, stowed fender to fender, are en route to combat zones on foreign soil. They will haul the oil from African ports to air fields, tank refueling depots, and supply dumps

Compromises Admitted in New Executive Order on Petroleum

By HENRY D. RALPH

There was general agreement within the industry that the executive order issued last week by the president goes only part way in answering demands for centralized authority. Most disappointing was failure of the order to give the administrator greater voice in price policies.

Text of the order following this review of expressions shows that Mr. Ickes' authority is substantially increased over many phases of operations.

WASHINGTON, D. C.—While the executive order naming Harold L. Ickes petroleum administrator for war contains "some compromises," it gives the Office of Petroleum Coordinator "broader responsibilities and powers to do our work," Deputy Coordinator Ralph K. Davies told an unofficial committee of New England senators and representatives at a hearing late last week.

The hearing was called by the New Englanders to inquire into the supplies of fuel oil—primarily heating oil—for their section, the oulook for the winter, and to develop reasons why they were not to get more.

He told the committee that he planned a meeting with WPB Director Nelson and OPA Director Henderson "to discuss the order on the work of the respective offices," and what can be done to further alleviate the fuel-oil situation in the East. He said "there are some things we (meaning OPC) can do now that we couldn't before," but did not enumerate them.

Later, during questioning, Senator Tobey, of New Hampshire, asked if there was a cooperative attitude between OPC and OPA. Mr. Davies said there always had been, and that the new executive order might be expected to iron out any difficulties "we may have had."

Representative Wigglesworth, of Massachusetts, after ascertaining from the witness that any order requiring conversion of oil-burning facilities to other fuel would have to be enforced by WPB; that any order affecting oil transportation would have to clear through Office of Defense Transportation, and all rationing orders concerning petroleum products are issued by OPA, remarked:

"So he's (Ickes) the oil czar, but the OPC is subject to WPB in some respects, ODT in others and OPA in others."

Other members of the committee indicated a similar belief that the order had not gone far enough in giving OPC control over oil.

On the subject of fuel oil for New England this winter, Mr. Davies said that the estimate made some months ago that supplies would be about 75 per cent of "normal," still stands up as what the OPC "hopes" to be able to do. He said this supply estimate is based on three conditions: First, that the people of New England and the entire East reduce gasoline consumption to an appreciable extent, thereby releasing tank cars and storage facilities for fuel oil; second, that military demand on the East Coast does not increase to any great extent, and third, that "we experience a reasonable degree of success in conversion to coal."

"We never know from day to day when we are going to be called upon for a large additional quantity of petroleum products for the military," he said, and, on the topic of conversions, added: "We are thoroughly disappointed with the contribution made to date with domestic conversions."

"We hope to get these conversions made by voluntary means, but are about to despair. I think the time is here when we may have to enforce conversion wherever it seems to be fair. We realize that we are dealing in human lives—both in a military and civilian sense—that's how seriously we take it."

He pointed out that OPC had made a recommendation to WPB more than 2 months ago asking for an order that oil supplies be cut off those users who could convert but did not. Nothing, he said, had come of the recommendation as yet. He added that he thought OPC's recommendations would have more weight in the future than in the past.

Robert L. Minckler, director of OPC's Division of Petroleum Supply, told the committee of his unit's efforts to provide as nearly as possible an adequate supply for the entire eastern seaboard. He told how pooling of products, use of common terminals capable of handling trainloads of products, and other steps were already showing their benefits, and described to the committee a map which his division had prepared showing how each of the various terminals would serve its territory.

While there may be some empty storage tanks in New England, he said, they are the ones not suited to efficient distribution. They may not have tank-car unloading facilities, they may be located in places not suitable for redistribution by trucks or other methods of transportation, or there may be some other reason why they have not been chosen.

Maj. J. R. Parten, head of OPC's Transportation Division, said he wanted to tell the committee what has been done and what "we expect to do" to increase transportation of petroleum products to the East.

There are now about 69,000 tank cars in the eastern service, he said, and his division makes a physical count of these cars every month. There have been as many as 70,500, but because of seasonal diversions to other uses (vegetable oils, chemicals, etc.) and to breakdowns, this number has been cut.

However, if the length of "turn-around" time, that is loading and unloading time, can be cut down, there will be a greater gain in rail transportation than addition of the other cars, he said That is the reason for development of large terminals, capable of handling many cars at a time, and available to other methods of transportation. The large new terminal at Linden, N. J., Major Parten pointed out, can unload 500 tank cars per day, and load 100,000 bbl. per day on barges for shipment to New England points.

EXECUTIVE ORDER

Establishing the Petroleum Administration For War and Defining Its Functions and Duties

BY virtue of the authority vested in me by the Constitution and statutes, as president of the United States and commander in chief of the Army and Navy, and in order to coordinate and centralize the war policies and actions of the Government relating to petroleum with a view toward providing adequate supplies of petroleum for the successful prosecution of the war and for other essential purposes, it is hereby ordered as follows:

1. Whenever used in this order:

(*a*) The term "petroleum" means petroleum, petroleum products, and associated hydrocarbons, including but not limited to natural gas, except that natural gas which has entered into gas-transmission lines from field gathering lines shall not be so included.

(*b*) The term "petroleum industry" means the production, refining, treating, storage, shipment, receipt, or distribution within the United States, its territories and possessions, of petroleum, exclusive of (1) the transportation of petroleum, (2) the transmission of natural gas from the point of its entry into gas-transmission lines from field gathering lines, and (3) the distribution of natural gas.

(*c*) The term "transportation" means transportation as defined in U. S. Code, Title 49, Section 1 (3) (a), and in Executive Orders 8989 and 9156.

2. There is established a Petroleum Administration for War, at the head of which shall be a petroleum administrator who shall be directly responsible to the president. The secretary of the interior shall serve ex officio as petroleum

administrator hereinafter referred to as the administrator.

3. The administrator shall:

(*a*) Subject to the provisions of this order, establish basic policies and formulate plans and programs to assure for the prosecution of the war the conservation and most effective development and utilization of petroleum in the United States and its territories and possessions, issue necessary policy and operating directives to parties engaged in the petroleum industry, and appoint such general, regional, local, or functional petroleum-industry committees or councils as the administrator finds necessary: Provided, that no directive issued hereunder shall conflict with any direction which may be issued by the chairman of the War Production Board pursuant to Paragraph 1 of Executive Order 9125 of April 7, 1942.

(*b*) Serve, as far as practicable, as the liaison and channel of communication between the units of the petroleum industry and the several departments and agencies of the federal Government on matters directly involving the functions and duties of the administrator.

(*c*) (1) Obtain from the Departments of War and the Navy, the Office of Lend-Lease Administration, the Department of State and the Board of Economic Warfare, the several divisions and branches of the War Production Board, and such other federal departments and agencies as may be appropriate, estimates of the amounts of petroleum which will be required from the United States, its territories and possessions, to meet direct and indirect military, and essential industrial and civilian, requirements; and compile and analyze such estimates and submit them to the War Production Board with recommendations for the allocation of petroleum to meet such requirements.

Estimate Material Needed

(2) Prepare and recommend to the War Production Board estimates of the quantities and kinds of material needed by the petroleum industry to produce, refine, store, distribute (excluding transportation), or otherwise make available the amount of petroleum recommended by the administrator for allocation by the War Production Board.

(*d*) Subject to the direction of the chairman of the War Production Board, exercise the powers, authority, and the discretion conferred upon the chairman by Paragraph 1 of Executive Order 9125 of April 7, 1942, by issuing, and taking appropriate action to enforce, such orders or directives to the petroleum industry as the administrator may deem necessary, in order to:

(1) Provide adequate supplies of petroleum for military, or other essential uses; or

(2) Effect the proper distribution of such amounts of materials as the chairman of the War Production Board may allot for the use of the petroleum industry.

(*e*) Compile data and make continuing surveys with respect to the effect of the prices charged for petroleum upon the efficient wartime operations of the petroleum industry and the maintenance of adequate supplies of petroleum for war and essential industrial and civilian uses. On the basis of such surveys, the petroleum administrator shall consult with and recommend to the administrator, Office of Price Administration, such upward or downward adjustments in the schedule of prices charged for petroleum as will, in the judgment of the petroleum administrator, assure the efficient wartime operation of the petroleum industry and the maintenance of adequate supplies of petroleum for war, and essential industrial and civilian uses. In order to enable the petroleum administrator to make appropriate recommendations, the price administrator shall advise with the petroleum administrator prior to the establishment or alteration by the price administrator of any schedule of prices to be charged for petroleum.

(*f*) Be advised of all plans or proposals which deal with the civilian rationing of petroleum and consult with rationing authorities in the development of such plans or proposals; and, in those instances where rationing is for the purpose of maintaining adequate supplies of petroleum for war and essential industrial and civilian requirements, determine, after advising with the War Production Board, the areas and the times within which such rationing should be effective and the amount of petroleum available for such purpose.

(*g*) Consult with the War Shipping Administration with respect to the assignment of tankers and the movement of petroleum, and, subject to the requirements of the Departments of War and the Navy, recommend allocations as between units of the petroleum industry of available tankers under the control of the War Shipping Administration.

(*h*) Designate the quantity and kind of petroleum to be shipped and received by those engaged in the petroleum industry, and certify such designations to the Office of Defense Transportation for appropriate action in providing the necessary transportation.

(*i*) Review all plans or proposals for the construction, extension, enlargement or interconnection of petroleum pipe lines; subject to the overall responsibilities of the Office of Defense Transportation, approve such plans or proposals as are, in his judgment, necessary to provide adequate supplies of petroleum for war and other essential uses and recommend to the War Production Board programs covering the amounts and kinds of materials needed for such pipe lines. The administrator shall direct the physical operation of petroleum pipe lines to the extent of prescribing the quantity and kind of petroleum to be transported by and the direction of flow through such pipe lines: Provided, that nothing herein shall be deemed to limit the functions and authority of the Office of Defense Transportation under Executive Order 8989 of December 18, 1941, with respect to the provision of necessary additional transportation facilities and equipment, or to coordinate and direct domestic traffic movements.

(*j*) Advise the several federal departments and agencies concerned with the construction, enlargement, or additional interconnection of any natural-gas-transmission line as to the supply and availability of natural gas at the proposed sources of production whenever such construction, enlargement, or interconnection will result in substantially altering the rate of production at such sources.

(*k*) Perform the duties and responsibilities with relation to petroleum and the facilities used in the petroleum industry imposed by Executive Order 9165 of May 19, 1942, upon the Department of the Interior.

Work With State Regulatory Bodies

1. Certify to the various state regulatory bodies having jurisdiction with respect to the production of petroleum, the amounts and kinds of petroleum which should be produced in their respective states, and collaborate with such state regulatory bodies in the coordination of their activities with the programs and policies of the administrator.

(*m*) Keep the president informed with respect to the progress made in carrying out this order and perform such other related duties as the president may from time to time assign or delegate to him.

4. The administrator shall collaborate with the appropriate federal departments and agencies authorized to determine plans and policies with respect to foreign petroleum activities. The administrator shall, in conformity with such plans and policies, issue directives concerning the physical operations of their foreign petroleum facilities to units of the American petroleum industry which directly or indirectly engage in such operations in foreign countries. The administrator shall be the channel of communication on foreign petroleum matters between the federal departments and agencies and such units of the American petroleum industry.

5. The administrator shall perform the functions with respect to rubber conferred upon the Office of Petroleum Coordinator for War by Executive Order 9246 of September 17, 1942, subject to such directives as the rubber director may issue pursuant to such order. Nothing in this order shall apply to or in any way limit the functions and authority, or the manner of executing the same, of the chairman of the War Production Board or the rubber director in the exercise of control over and administration of the nation's rubber program pursuant to said Executive Order 9246, or the functions and authority of any department, establishment or agency in the execution of such aspects of the rubber program in such manner and for such period of time as the rubber director may direct pursuant to said Executive Order.

Designate Advisors

6. Subject to such restrictions as may be imposed by the Departments of War and the Navy with respect to their own requirements, the several federal departments and agencies shall supply such information and data as the administrator may require in performing his functions and shall advise with the administrator before undertaking any action which might affect the continuous, ready availability of petroleum for military and essential industrial and civilian needs. In order to assist him in carrying out the purposes of this order, the administrator may establish or designate committees or groups of advisors, representing two or more departments or agencies of the federal Government, or states. The administrator shall meet at regular and special intervals with representatives of the various federal departments and agencies having continuing functions directly related to petroleum or the petroleum industry.

7. The administrator may appoint, with the approval of the president, a deputy administrator, who shall report directly to the administrator, and to whom he may delegate any and all power, authority, and discretion conferred upon him by this order. The deputy administrator shall serve as acting administrator in the absence of the administrator. The administrator, within the limits of such funds as may be allocated or appropriated for the purpose, may employ necessary personnel and make provision for necessary supplies, facilities, travel, and services.

8. The Office of the Petroleum Coordinator for National Defense, later changed to the Office of Petroleum Coordinator for War, established by the letter of the president dated May 28, 1941, is abolished, and its personnel, records, property, and funds are transferred to the Petroleum Administration for War, effective 15 days from the date of this order (December 17). All orders, directives, agreements, recommendations, and other documents issued or entered into under the functions, duties, and authorities of the petroleum coordinator for war shall remain in force as the responsibility of the administrator until such time as he may revoke, alter, or otherwise change such documents under provisions of this executive order.

9. Nothing in this order shall be deemed to

limit in any way the authority of the Departments of War and Navy to initiate or carry out directly, without review or approval by the administrator, any action relating to petroleum or the petroleum industry which either department deems to be a matter of military necessity or expediency and which arises in such areas and is of such military urgency as to require special or secret disposition; or to limit in any way the functions and authority of the secretary of state, under the direction of the president, in the formation of the foreign policy and the conduct of the foreign relations of this Government; or to limit in any way the statutory powers of the Interstate Commerce Commission with respect to rates, charges, statistics, accounts, car service (including emergency service powers) or operating authority; or to limit in any way the exercise of the authority of the Federal Power Commission or the performance of its functions and authority under the Natural Gas Act (52 Stat. 821) as amended; or to limit the functions and authority of the Board of Economic Warfare under the Act of June 30, 1942 (56 Stat. 463); or to limit in any way the powers of the price administrator under the Emergency Price Control Act (56 Stat. 23) and as amended by Public Law 729, 77th Cong., 2d session.

10. Any provisions of pertinent executive orders in conflict with the provisions of this order are hereby superseded: Provided, that nothing herein shall be deemed in any way to limit the functions and authority of the chairman of the War Production Board under Executive Orders 9024 of January 16, 1942; 9040 of January 24, 1942; 9125 of April 7, 1942, and 9246 of September 17, 1942; or to limit in any way the functions and authority of the Federal Power Commission under Executive Order 8202 of July 13, 1939; or to limit in any way the functions, duties, or authority of the War Shipping Administration with respect to the operation, control, purchase, requisition, charter, repair, use, or insurance of any vessel or cargo; or to limit the functions and authority of the Board of Economic Warfare under Executive Orders 8839 of July 30, 1941, as amended; 8900 of September 15, 1941; 8926 of October 28, 1941; 8942 of November 19, 1941, and 9128 of April 13, 1942; or to limit the functions and authority of the Office of Lend-Lease Administration under Executive Order 8926 of October 28, 1941.

Intraindustry Supply Sales Are Authorized By Order P-98-c

OBSTRUCTIONS in Priorities Regulation 13 which prevented virtually all intraindustry exchange and sale of inventory equipment were removed last week by Preference Rating Order P-98-c, issued December 1 by the War Production Board on recommendation of the Office of Petroleum Coordinator.

Previously, oil operators were prevented from selling equipment already in their stocks of supplies, except by specific authorization of the War Production Board. The prohibitions contained in Priorities Regulation 13 were so strict and ramified that operators generally declined to attempt disposal of any excess inventories they might have accumulated. Regulation 13 prevented "special sale" of carbon steel in lots of more than 5 short tons to another consumer except on a Preference Rating AA-2x, the highest nonmilitary rating in the priority system. (See The Oil and Gas Journal, p. 32, October 22, 1942.)

Between September 23, when Priority Regulation 13 was issued, and December 1, effective date of PR P-98-c, the oil industry has been operating under incompatible conditions. The industry has been urged on the one hand to make maximum use of materials in inventory while, on the other hand, practically prevented from so functioning by preventing sale and exchange of supplies at a priority level for which few of its operations could qualify. Supply sales and exchanges within the industry are still subject to provisions of Conservation Order M-68 and P-98-b. Thus, equipment is still restricted by the basic orders applicable to oil-industry operations but P-98-c thaws the previously frozen aspects of supply sales among companies and individuals engaged in the petroleum business.

Used materials and inventories supplies cannot be sold to supply companies under terms of P-98-c but are still restricted by provisions of Priorities Regulation 13.

The new order does not authorize the receipt or use of materials in violation of an inventory, quota or use restriction imposed by any order or regulation, except that portion of PR 13 which froze intraindustry sale and exchange.

"By using stocks already in inventory," Deputy Petroleum Coordinator Ralph K. Davies explained at Washington, "the oil industry will be taking advantage of materials already in stock and will, as a result, reduce the number of requests for priority assistance to obtain materials that have recently been or are yet to be manufactured."

Text of the order follows:

PART 1041—PRODUCTION, TRANSPORTATION, REFINING AND MARKETING OF PETROLEUM

(Preference Rating Order P-98-c)

For the purpose of facilitating special sales of idle or excess materials by persons engaged in the petroleum industry to other persons engaged in the petroleum industry, it is hereby ordered that persons engaged in the petroleum industry may sell such material to other persons engaged in the petroleum industry upon the terms hereinafter set forth:

(*a*) Definitions. The definitions of Preference Rating Order P-98-b shall apply in this order.

(*b*) Sales of materials between operators. Any operator may sell to any other operator material from the seller's stocks or inventories, and any such sale shall be expressly permitted within the terms of paragraph (*c*) (3) of Priorities Regulation 13, as amended from time to time.

(*c*) Applicability of orders and priorities regulations. This order does not authorize receipt or use of any material by any person in violation of any inventory, quota or use restrictions imposed by any order or regulation. This order and all transactions affected thereby are subject to the applicable provisions of any priorities regulation issued by the War Production Board, as amended from time to time.

(*d*) Communications. All reports which may be required to be filed hereunder and all communications concerning this order shall, unless otherwise directed, be addressed:

1. By any person located in the United States, its territories or possessions to: Office of Petroleum Coordinator, South Interior Building, Washington, D. C., Ref.: P-98-c.

2. By any person located in the Dominion of Canada to: Office of Oil Controller, Dominion of Canada, Toronto, Canada, Ref.: P-98-c.

(*e*) Violations. Any person who wilfully violates any provisions of this order or who wilfully furnishes false information to the Director General for Operations in connection with this order is guilty of a crime, and upon conviction may be punished by fine or imprisonment. In addition, any such person may be prohibited from making or obtaining further deliveries of or from processing or using material under priority control and may be deprived of priorities assistance by the Director General of Operations.

(*f*) Effective date. This order shall continue in effect up to but not after January 1, 1943, unless sooner revoked. (P.D. Reg. 1, as amended 6 F.R. 6680; W.P.B. Reg. 1, 7 F.R. 561; E.O. 9024, 7 F.R. 329; E.O. 9040, 7 F.R. 527; E.O. 9125, 7 F.R. 2719; sec. 2 (*a*), Pub. Law 671, 76th Cong., as amended by Pub. Laws 89 and 507, 77th Cong.)

Two Restrictions Remain in Order Limiting Distribution

WASHINGTON, D. C.—War Production Board, acting on recommendation of the Office of Petroleum Administrator, has removed all but two of the restrictions regulating motor-fuel distribution, Office of War Information announces.

An amendment to Limitation Order L-70 made the changes in the restrictions—L-70 formerly regulated service station hours of operation and the delivery of motor fuel to them.

Retained in the amendment to Limitation Order L-70 were restrictions on shipment of gasoline from the East Coast and the Pacific Northwest areas to other sections of the country.

The following terms are prescribed in the amendment:

Effective December 15, the amended order prohibits suppliers from shipping motor fuels from the 17 East Coast states and the District of Columbia for sale outside that area. An exception is made, however, for bulk plants that actually delivered motor fuel by tank truck to service stations outside the area during the period December 1, 1941-February 28, 1942, if the bulk plants continue delivery by tank trucks.

Effective December 1, no supplier may deliver motor fuel from any point in Oregon or Washington to any point outside those states unless (1) the motor fuel is manufactured from crude oil or natural gas produced in Colorado, Idaho, Montana, Utah, or Wyoming, or (2) the motor fuel is delivered by tank truck from bulk plants that served areas outside the two Northwest states during the period December 1, 1941-February 28, 1942.

Railroads Move 778,852 Bbl. Daily To East Coast Terminals

WASHINGTON, D. C.—Tank-car shipments of petroleum and petroleum products to the East Coast during the week ended November 28 were at the average rate of 778,852 bbl. daily.

This is an increase of 10,103 bbl. per day over the previous week, when east-bound movement averaged 768,749 bbl. daily.

Thirty-nine companies loaded 25,358 cars to handle the 7-day total of 5,451,970 bbl. of petroleum and petroleum products shipped to the East Coast. Tank-car loadings averaged 215 bbl. per car.

Increase of 400,000 Bbl. in Daily Demand Seen in 1943

WASHINGTON, D. C.—Crude-oil production in the United States must be increased by more than 400,000 bbl. per day over present figures by the fourth quarter of 1943 to meet demands without drawing on stocks, the committee on economics reported to the Petroleum Industry War Council December 8.

Before the war is over the industry may be unable to produce sufficient crude to meet war requirements if present trends in decline of discoveries and new reserves continue, it warned. The committee estimated requirements of crude production during the fourth quarter of 1943 at 4,185,000 bbl. daily, plus 267,000 bbl. of natural gasoline and other supplies, or a total of 4,452,000 bbl. daily. Domestic demand plus export is estimated at 4,670,000 bbl. daily of crude and products, to be met by reduction in stocks of 111,000 bbl. of crude and 107,000 bbl. of products daily and from daily United States refinery runs of 4,204,000 bbl.

Recommendations made to the council were:

1. Since indicated supplies in District 1 are inadequate to meet even recently reduced demand, the petroleum administrator should inform OPA that further curtailment in consumption should be effected.

2. A study should be made immediately of the lowest level to which stocks in District 1 can fall by changing methods of delivery, lowering refinery runs, pooling arrangements and other steps.

3. Methods of handling fuel-oil inventory and ration coupons should be changed to prevent undue drain on stocks of primary suppliers and avoid building up distributors' surpluses during later part of the shortage period.

More District 3 Oil Sought

4. Because production in District 2 is declining and stocks in the eastern part of that area are down to 9.5 days' supply, no increased shipments should be made from there until further efforts have been made to increase shipments from District 3 without, however, resorting to inefficient use of tank cars.

5. Increased crude-oil production requirements during 1943 emphasize the paramount importance of increasing producible reserves.

6. Estimates of military requirements in District 5 beyond the first half of 1943 should be obtained in order to provide for additional demands.

7. Long-range studies should be made of supply and demand factors in District 5 in order to judge whether steel can be best used to increase production in California or for moving oil from District 4 to the Pacific Coast.

Regarding the East Coast, the committee said the industry faces these two problems:

1. An even more serious shortage of supplies in comparison with essential demand. This change is due mainly to increased military requirements on the East Coast, and has been only partly offset by more stringent rationing provisions thus far applied.

2. The difficulty of balancing refinery runs and products yields, especially for Districts 1, 2 and 3 in view of the necessary minimum runs to stills and resulting gasoline production inherent in producing essential war products.

Recent experience has shown that the availability of petroleum and carrying capacity are subject to quick and drastic changes under existing war conditions, the committee pointed out. This is especially true of tanker deliveries. In view of the uncertainty of this source of supply, Table 1, summarizing the committee's forecast of East Coast supply and demand over this winter, compares demand requirements with deliveries by methods other than ocean tanker.

These estimates indicate that the East Coast will need ocean tanker deliveries over the winter averaging 154,000 bbl. daily to meet the demand requirements shown. The OPC estimates of tanker deliveries used in the subcommittee's report for the period average only 94,000 bbl. daily. In view of the possible additional need of tankers for service elsewhere, these deliveries might be reduced to a residual amount of approximately 50,000 bbl. daily, corresponding to deliveries by tankers suitable only for limited coastwise service. Thus an estimate of the shortage that must be faced this winter, even after more drastic rationing, is in the range of 60,000 to 104,000 bbl. daily.

Regarding demand, the estimates shown reflect a decrease in domestic consumption in District 1 from previous forecasts of 130,000 to 140,000 bbl. daily, in accordance with estimates made by OPA of the influence of more stringent rationing on gasoline (i.e., a reduction of 80,000 bbl. daily) and further forced conversion of distillate and residual fuel oil to coal (i.e., reduction of 50,000 to 60,000 bbl. daily). These estimates of reduction in consumption have resulted from the request of the WPB that consumption be reduced to this extent. An increase in export requirements for military purposes partly offsets these changes and results in a net estimated reduction in District 1 demand over the period of approximately 75,000 bbl. per day from that previously forecast.

The committee has no way of determining the extent to which local consumption in District 1 will actually be reduced, or the rate at which the reduction will be accomplished. This reduction is

(Continued on Page 28)

Council Congratulates Ickes, Pledges Continued Support

WASHINGTON, D. C.—Congratulations to Secretary Ickes on his appointment as petroleum administrator for war were extended by the Petroleum Industry War Council at its December meeting Tuesday, exactly a year after the council held its organization the day war was declared.

Administrator Ickes was warmly greeted by the council and Chariman Boyd praised the work he has done for the industry and pledged continued support. Mr. Ickes responded by thanking the council for its cooperation and work, and explained the added powers and responsibilities given PAW by the president's executive order.

Mr. Ickes paid tribute to the late William S. Farish and the council adopted a resolution of regret at his death.

Chief subject of discussion was the executive order and PAW Chief Counsel Howard Marshall explained it in detail.

Estimates that rationed demand of petroleum products on the East Coast will be difficult to meet from supplies now foreseeable were presented by Dr. Robert E. Wilson, chairman of Petroleum Economics Committee.

TABLE 1—FORECAST OF DEMAND VS. NONTANKER SUPPLIES FOR DISTRICT 1
(Figures in thousands of barrels daily)

	December	January	February	March	Average Dec. 1942-Mar. 1943
Supply by nontanker methods from outside:					
Tank car	753	714	780	875	781
Pipe line	158	173	188	188	177
Barge and lake tanker	97	104	106	113	105
Local production	81	80	80	78	80
Total supply (ex ocean tanker)	1,089	1,071	1,154	1,254	1,142
District 1 demand (local* and export):					
Gasoline	440	437	439	444	440
Kerosene	193	182	160	144	170
Distillate	365	363	342	301	343
Residual	292	291	279	273	284
Other	129	121	122	130	125
To other districts	22	22	22	22	22
Total demand	1,441	1,416	1,364	1,314	1,384
Difference: demand less nontanker supplies	−352	−345	−210	−60	−241
Shortage vs. desired minimum-stock level of 52,000,000 bbl. as of March 31, 1945	−154	−154	−154	−154	−154

*Local demand as rationed.

STATE CAPITALS...

Texas Operations Not Yet Impeded By Rationing; Protests Continue

FORT WORTH, Texas.—Work of oil company superintendents and engineers and service and supply men in Texas was not impeded by the gasoline rationing program, started last week. Most were operating on C or T cards, giving them as much fuel as required.

For the men who have to travel rather long distances, both oil and supply companies were inaugurating combination train and car travel with automobiles stored at railheads. The present and future gasoline allotments are based on past experience and most field men expressed the opinion that they were going to be sure to use up the allotted rations to such cars to prevent being deprived of necessary mileage later. It is evident that some liberalization is going to be needed to keep people from using gasoline when they don't need it so as to insure a supply when a necessity exists.

For instance, one man was having trouble with his rationing board because he couldn't show the necessity for specified amount in a given period. His situation was such that he might not need other than the A-card ration for a month or more but then might require several thousand miles in a few weeks.

In the smaller areas, rationing books for supplemental gasoline were in car-owners hands before rationing went into effect. In most cases rationing boards knew the ones applying and no proof of necessity was required. One man reported that when he appeared before the board he was told he had to answer three questions, his name, the license number of the vehicle and the amount of gasoline needed.

More difficulty was experienced by persons in the larger centers of population although at least one board was practically taking the applicant's word for the necessity of supplemental fuel.

The Potter County board (Amarillo, Tex.) threw the state rationing system into a spin when it refused to issue supplemental rations to many government employes. The United States deputy collector of internal revenue was termed "just another bill collector," and his application refused. The board had just refused a large local department store extra gasoline for its bill collector and one member of the board pointed out that if the department store couldn't pay its bills, it couldn't pay its taxes. "What is good for the department store is good for the federal government," he added. The Potter County board was acting on the principle that those engaged in essential war work and in protecting the health and welfare of the community could have gasoline and all others, including state and federal bureaus, couldn't.

The state director of OPA, Mark McGee, said the board had no discretion in the matter but the board thought differently.

Criticism of rationing was practically universal and was expressed by some members of local boards, service-station operators and those who get ample gasoline for their work because of supplemental cards. The objection was to the method used, the failure to provide for maintenence of essential civilian functions, the confusion over putting the system into operation.

The instruction from local boards to provide gasoline on the signature of a patron claiming an emergency relieved many station operators who had no R-555 forms. In some areas, persons known to the station operator were getting gasoline on this basis until they received the necessary ration books.

Traffic had both decreased and slowed down and a further reduction in the number of cars on the highway was anticipated. In the larger areas it was not so noticeable but in the smaller communities the town squares were practically devoid of cars. The situation was evidently a serious inconvenience to lease workers who live near the job and who do not have to drive very far to work but are located from 5 to 20 miles from a trading center. Some were hitch-hiking into town to save gasoline.

A check of gasoline stations showed that sales were off more than 25 per cent and very few "A" coupons coming in except in cases where the driver also had an application for a B or C card.

There was some evidence that OPA might already have instituted an espionage system as two stations reported that men admitting to having plenty of gasoline were trying to buy more at 50 cents per gallon.

Texas officials were continuing their protests to gasoline rationing as being an unnecessary burden on the people and a hindrance to the war effort.

●

TEXAS

HEARINGS were postponed this week on the application for injunctions to prevent the Railroad Commission from enforcing its order limiting oil production to 1 bbl. for each 10 bbl. of water produced in the wells in the East Texas field. The Konowa Operating Co. and 20 others had applied to the Ninety-eighth District Court at Austin while the Roosth & Genecov Production Co. had asked relief of the 126th District Court. The former hearing was to have been on December 4 and the latter on December 7.

The chairman of the Railroad Commission, E. O. Thompson, requested postponement of the hearings at the same time announcing that no attempt would be made to enforce the order until after tests had been made on the properties involved in the suits. The order was to have become effective on December 1.

Railroad Commission engineers were busy on the west side of the East Texas field, installing small portable tank-battery units to test the water, oil, and total fluid output of the wells. About 25 days will be needed to complete the test, according to Colonel Thompson.

Object of the order was to control fluid production so as to maintain the field's bottom-hole pressure while at the same time increasing its oil production. An alternative plan was the transfer of allowables of the wells producing large amounts of water to those not making water. Basis for the suits was the state's marginal well law which prevents the restriction of wells making less than 20 bbl. of oil daily.

THE JANUARY PRORATION schedule for Texas operators will be determined on the basis of testimony presented at the state-wide hearing scheduled in Austin December 16.

CALIFORNIA

THE PRODUCTION COMMITTEE for OPC district 5 has allocated California production for December on the basis of 815,000 bbl. per day. Operators will be allowed to produce 771,100 bbl. of crude and 43,900 bbl. of natural gasoline and distillate per day. The November allowable was 738,000 bbl. of crude oil and 41,000 bbl. of natural gasoline and distillate per day.

A NEW SURVEY of oil operations has been authorized by the California Conservation Committee for the purpose of determining how much drilling should be done in 1943, where the development work should be concentrated, how much material will be required to fulfill the program, and how much of the necessary supplies are now in hands of operators.

R. P. Huggins, chairman of the conversation committee and general manager of Western Gulf Oil Co., was authorized to appoint a group of five men to conduct the survey.

The amount of sustained production that can be expected during 1943 will be estimated by the committee and a check will be made to ascertain if there will be sufficient manpower to fulfill the development program required to meet demand.

A similar survey was made several months ago but the increased production requirements from California and various other changes in conditions since it was completed warrant the new study, operators decided.

The committee survey of the manpower situation in the oil industry will seek accurate information as to the actual number of barrels of current production lost because of lack of sufficient labor. Such loss of production due to lack of men will serve as an accurate gage of the effect on the war program of drafting of necessary and experienced oil-field employes, and the industry will then be in a position to petition the proper governmental agencies for relief.

ILLINOIS

FEDERAL REGULATIONS are discouraging Illinois oil operators to explore deeper horizons in the oil fields in the southern section of the state, asserted Robert M. Medill, director of mines and minerals.

Since issuance of federal Order M-68-5 amended, which permits closer spacing to sand horizons, Mr. Medill said his department finds "a great number of instances where operators, failing to find production, abandon and plug their wells in sand zones."

They prefer, he said, abandonment rather than go through the cumbersome procedure of obtaining an exception from the Office of Petroleum Coördinator to drill deeper horizons.

the OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

Published weekly by The Petroleum Publishing Company at Tulsa, Oklahoma

Realistic View Needed

The executive order creating the Petroleum Administration for War as the successor to OPC leaves the petroleum industry about where it was relative to the division of governmental powers in matters affecting major oil policies.

Federal control over existing operations of the industry is broadened and more definitely established and responsibilities are increased, but final authority in the all-important matters of materials, price, rationing, and transportation largely continue with other war agencies.

The long-awaited order gets off to a good start in stating that the administrator, who reports directly to the president, "shall establish basic policies and formulate plans and programs to assure for the prosecution of the war, the conservation and most effective development and utilization of petroleum . . . " Such a program, with powers to carry it out, would end the existing fears that petroleum operations will be so circumscribed with governmental regulations that the industry will not be able to do its full part throughout the emergency.

The administration with its greater centralization of duties in matters pertaining to the movement of products to the military, the direction of operations including the manufacture of war products, and the coordination of many other functions, should tend to end the confusion of the past year in government-industry relationships and make for greater efficiency. It is also true that in the transfer of OPC to the administrative unit the industry is assured a personnel thoroughly acquainted with its techniques and in substantial agreement with operators as to what must be done now and later to assure adequate oil supplies for the United Nations.

But it would be shortsighted and worse to assume that the oil business now has a Washington setup to quickly bring about the changes in the Government's administration of oil which those most familiar with conditions agree are necessary at this particular period.

In regard to materials the order makes clear that everything that is done by the petroleum administrator "is subject to the direction of the War Production Board." Considerable stress is placed in the order on the relationship of price to efficient wartime operations, but here again the oil administration in effect is restricted to investigations and recommendations. It has no final control of what happens in the rationing of petroleum products.

And so it is in respect to shipping and transportation where anything that is done by the new agency must not conflict with the powers of the War Shipping Administration and the Office of Defense Transportation.

Responsibilities of far-reaching importance are imposed on the administrative unit and the oil industry in every phase of its operations in relation to the war efforts. Despite this, the order leaves no doubt that the president intends that the final say as to how it shall be done will remain with those agencies which up to this time have not manifested any concern as to the pressing problems of the oil business. They have in some instances taken an antagonistic position whenever the war difficulties of operators are called to their attention.

Operators will have to take a realistic view of what has happened. The objective of a single governmental organization which could deal directly and adequately with the numerous war problems, can be forgotten for the immediate future—possibly for the duration.

All divisions of the industry will continue to support the petroleum administrator as they did the coordinator as far as his powers extend, but at the same time they should give more attention to those agencies where final decisions are to be made.

Otherwise, there is a very real danger that the oil business and the war will be lost in the labyrinth of Washington's manyheaded war policy.

Federal Order Digest

WPB Preference Orders

ETHYL ALCOHOL AND RELATED COMPOUNDS—Amendment 3, General Preference Order M-30 (as amended August 8, 1942): Restricts deliveries by manufacturers and distributors during December and first quarter of 1943 to not more than 50 per cent of volume handled in corresponding quarter of year ended June 30, 1941, for specified consumption, effective December 2.

PRODUCTION, TRANSPORTATION, REFINING and MARKETING OF PETROLEUM-PR P-98-c: Authorizes oil operators to sell another operator any material in stock without obtaining prior permission from the WPB. Operators can sell materials to suppliers or to other industries only in accordance with Priorities Regulation 13, effective December 1, 1942.

IRON AND STEEL—Amended M-126: Specifically prohibits use of critical metals in long lists of civilian goods, effective November 30, 1942.

CHLORINE—General Preference Order M-19 amended: Removes certain products containing available chlorine from control such as liquid sodium hypochlorite, calcium hypochlorite, sodium chlorite and similar products. Changes end-use restrictions to complete allocation control, effective December 1.

OPC Recommendations

PROCESSING AND REFINING—Recommendation 58: Contains OPC instructions on use of fatty acids and fatty oils in manufacture of lubricating greases, limits use of fatty oils, from which glycerin can be obtained, requires quarterly reports, effective January 1, 1943.

WPB Limitations

MOTOR FUEL—Limitation Order L-70 amended: Removes all restrictions except prohibition against out shipments from District 1 and from two northwestern states, effective December 1.

ASPHALT AND TARRED ROOF PRODUCTS—L-228: Restricts grades and types of asphalt and tarred roofing products and asphalt shingles that may be produced after January 1, 1943 to sizes and forms specified in Exhibit A of the order.

HARD FACING MATERIALS—Limitation Order L-223: Restricts delivery of hard-facing material to orders rated AA-5 or higher, except for research and testing. Limits inventory to 60-days' supply, requires monthly reports on Forms PD-733, 734 and 735, effective December 2.

Prices

INDUSTRIAL RUBBER—Maximum Price Regulation 149, Amendment 4: Establishes price ceilings for sale of industrial hose made with neoprene, including fuel-oil and gasoline hose (not for service station pumps), oil-suction and discharge hose, tank-car and truck hose, effective December 8.

Export Control

IRON AND STEEL PRODUCTS—Export Control (Amendment LXXVII): Requires copy of definite commitment from supplier or disclosure of efforts to secure supplier. Also requires full specifications on quantity, quality, analysis and sizes with each export application, effective November 25, 1942.

Rationing

FUEL OIL RATIONING—Ration Order 11, Amendment 12: Postpones effective date of certain provisions to December 10, effective November 30.

MILEAGE RATIONING—Supplement 1 to Ration Order 5C: Sets 3 gal. value on A, B and C coupons in 17 eastern states and District of Columbia: 4 gal. in all other parts of the country; provides 1½ gal. for Class D; 1 gal. for Class E and 5 gal. for Classes T-1 and T-2, effective December 1.

Increase of 400,000 Bbl. in Daily Demand Seen in 1943

(Continued from Page 25)

imperatively needed to make up for increasing military demands, and probably even a greater reduction will be required. The OPA's estimated decrease in local consumption of 130,000 to 140,000 bbl. per day resulting from the measures announced by the OPA is equivalent to a total of 16,000,000 bbl. over the forecast period and will undoubtedly result in hardship as it eliminates all of the "intermediate" demand and part of the essential demand.

Clearly, every effort should be made to increase tank-car deliveries over those estimated by pushing to the maximum the steps necessary to increase movement in trainload lots, which will require the utmost in industry cooperation in the way of pooling, loading and unloading facilities and stocks. Additional tank-car repair facilities are also urgently needed at many points, as delays in repairing cars are a serious bottleneck today.

While tank-car deliveries have been slightly lower than those previously forecast by the committee, fuel-oil consumption for heating has been lower than estimated due to warmer weather than normal during October and the first part of November, so that total stocks at the end of November will be somewhat higher than forecast in the last report. The overage, however, occurs mainly in gasoline stocks, leaving residual fuel-oil and crude-oil stocks at critically low levels. The distribution of stocks between areas in relation to demand is also an important question in order to avoid concentrated local shortages.

The shortages have been calculated against a minimum stock figure for total crude and products in District 1 of 52,000,000 bbl. as of March 31, 1943, which figure was used in the committee's last report as being a desirable minimum for that date. Since that report preliminary studies indicate that lower minimum stocks can be attained at this time under emergency conditions. The question of what actual minimum levels can safely be tolerated is one which the committee believes deserves careful study by the proper agencies, and such study is again recommended. Any reduction in the minimum figure used as of March 31 will require thorough industry cooperation and proper distribution of these stocks by products and between areas in District 1 in relation to demand. As an offset against this probable decrease in minimum required stocks is the fact that the armed services have recently tended to "freeze" certain stocks for military purposes which is disruptive of plans to care for other demand also essential to the war effort. The committee believes, on the whole, that the relief which may be afforded by any increase in tank-car deliveries, or reduction in stocks below the minimum levels assumed, will be more than offset by the probable lag in securing estimated reductions in local demand. Thus, it would appear that after all of the foregoing allowances, District 1 must face a shortage in the range of 50,000 to 100,000 bbl. daily over the winter, unless higher tanker deliveries can be obtained.

This situation makes it clear that the use of gasoline for all but essential driving must be eliminated, and that consumption of fuel oils for heating be reduced to the bare minimum necessary for maintenance of public health. Even after this is done the shortages that will remain are both serious and substantial and can only be met by increased tanker deliveries. The question of maintenance or increase of tanker deliveries is one of military policy, outside of the scope of this committee. If the tanker deliveries required cannot be made available, the shortage remaining, after cutting the consumption of gasoline and of fuel oil for heating to the bare minimum, should be distributed between gasoline and the various types of fuel oil in such a manner as to occasion the least interference with the war effort.

Increased war-product requirements, reduced civilian demand as the result of rationing, and decreased available transportation still complicate the problem of crude runs in Districts 1, 2 and 3, and the refinery yields necessary to balance supply and demand without excessive stock accumulations in District 3. The growth of refinery capacity for producing critical war products is tending to increase required minimum runs at the plants involved. This automatically reduces the runs necessary at the nonwar plants to meet essential civilian requirements within the limits of available transportation facilities.

The runs anticipated by the functional committees in Districts 1, 2 and 3 are shown in Table 2.

It is only possible to achieve the operating program outlined because of the marked change in the proportion of the different products required in District 3, as the outlet to District 1, as limited by the estimated available transportation, is some 90,000 bbl. less than previously forecast. The principal change is the anticipated diversion of part of the residual fuel-oil requirements from the Gulf Coast to other sources. This program of the district committee will also require a product stock accumulation over the winter of 75,000 bbl. daily in District 3, 58,000 bbl. daily of which will occur in gasoline inventory. This accumulation will lessen flexibility necessary to maintain the production of essential war products and while supplying essential civilian demand,

TABLE 2—ANTICIPATED REFINERY RUNS

	Barrels daily December 1942-March 1943	Barrels daily last 6 months of 1941	Percentage of runs for last 6 months of 1941
District 1	573,000	726,000	79
District 2	1,125,000	1,131,000	99
District 3	1,260,000	1,482,000	85

particularly railroad fuel oil from refineries in the interior of District 3. Even after these stock accumulations, the approximate balance indicated is precarious, as changes in product requirements, especially of residual fuel oil, would create an impossible condition. Relief from this situation can only be obtained by reallocation of refinery runs and transportation facilities among the three districts.

Anticipated yields indicate that substantial changes are necessary in current operations and if these changes are not made, on the basis of the crude runs estimated, there will be a substantial overproduction of gasoline with a corresponding reduction in necessary supplies of distillate and residual fuel oils.

For the first time, the committee included a forecast of supply and demand in District 5, but said that estimates of military requirements should be made available for a longer period than the first half of 1943. It said that loss of tanker service to Washington and Oregon would upset calculations and because of the difficulty of substituting tank cars for this movement these tankers should be kept in service as long as any coastwise operation is possible. Regarding supply it said:

"While adequate rail deliveries are available from District 4 to the Pacific Northwest, comparatively little shut-in production exists in District 4. The only possibility of increasing supplies in District 4 would be by drilling up so-called black-oil reserves, the production of which is satisfactory fuel oil without processing. Price levels and transportation costs are such that this supply would in no wise be an economic source under normal conditions. Consequently, provision of funds and necessary critical materials for developing this source of supply as a reserve for emergency use would be purely a government matter. Thus, assurance of continuity of supply of a substantial portion of the Pacific Northwest requirements is essentially a military question. The decision as to whether provision should be made for tanker supply or steel and capital should be expended for developing reserves in District 4 rests with government authorities.

"In regard to the question of sudden large and continued increases in military needs, it should be pointed out that District 5 could for a period of time meet large increases in military requirements. This is possible only because of the existing large aboveground stocks of residual fuel oil. Some shut-in potential crude-oil production exists which could be readily converted into products required for military use. Liftings of products for military use are currently running below estimated requirements and, to the extent that this continues, reserve stocks will be higher than those forecast. On the other hand, for the longer term, existing wells could not maintain even the existing rates of production and additional drilling is definitely necessary before these aboveground stocks are depleted below safe levels.

"The supply of Navy fuel oil and other military requirements from District 5 involves the least expenditure of critically limited transportation, so that obviously all possibilities of local supply should be exhausted before consideration of other alternatives outside of the district. Steel for drilling in California is probably more readily available than tanker or pipe-line steel which would be required for development of supplies from other sources so that on anywhere near a break-even basis it would doubtless be preferable to develop existing reserve sources in California. In this connection the committee wishes to call attention to the proper authorities that serious consideration should be given to the development of existing naval reserves in District 5 which would provide substantial reserve production capacity with relatively low expenditures of steel in order to meet possible substantial increases in requirements of Navy fuel oil.

"To provide a basis for comparison of steel expenditures for drilling in California with the metal requirements from alternative sources, a forecast supply and demand program for District 5 is necessary, projected over the year 1943 and probably longer. This program would serve as a basis for the necessary crude-oil production studies, a large part of which already have been made on the amount of steel required for the drilling necessary to meet forecast requirements and, as a special case, the expenditure of steel and time required to make adequate provision for increases in military requirements. The top limit of production in this case would be that corresponding to total available refinery capacity, plus allowance for potential production of some heavy crudes suitable for use as fuel oil without processing.

"With this program established it would then be possible, by a comparison of steel requirements for drilling in California with steel expenditures for increasing and transporting oil from sources outside of the district, to determine whether or not alternative sources should receive any further consideration, or whether attention should be solely concentrated on the development of California supplies for the total of all scheduled requirements, plus possible increases up to the limit of refinery capacity. The time indicated as necessary for additional drilling in California to meet possible increases up to the limit of refinery capacity would serve as a basis for establishment of adequate stock levels of crude and individual products to meet emergency conditions. These stock levels, together with estimates of demand, would then provide a defensible basis for the necessary month-to-month schedules of crude-oil production in California to meet requirements."

Ickes Warns Nation of Fuel-Oil Shortage, Urges Conversion

WASHINGTON, D. C.—Petroleum Administrator Ickes told a nation-wide radio audience Tuesday night that he believes it possible to supply the Atlantic seaboard states with a majority of normal unrestricted heating-oil requirements, but added that this is not a guarantee and can be achieved only if householders who can convert to coal do so.

He said also that more industrial plants must convert from oil, more heat-saving measures must be put into effect universally and the use of gasoline in the East must be reduced to absolute essentials.

Gasoline rationing outside the East is a closed issue as long as the rubber problem remains to be solved, he said, since it was determined upon by the Baruch committee and others who have studied it as the only practical way to control tire use.

Most of his address was devoted to an explanation of the necessity for rationing fuel oil in the Midwest. As to the East, he said that the PAW is hopeful of preventing real hardship but that extent of conversions will be the determining factor.

"It must be borne in mind," he went on, "that this estimate is subject always to unpredictable developments in the theater of war, over which none of us has, or can have, any control or any right to prophesy. The military and naval developments in North Africa, the Far East, or any other part of the embattled world, could change the situation very suddenly and without notice. If anything of the sort should happen we shall be required of course to readjust the demands to more limited supplies and make the necessary announcement to the people."

Curtailment of heating oil in the Midwest, Mr. Ickes said, was not born of some dictatorial whim, but was done to furnish the closest source of supply for transshipment to the famished East and to provide the closest supply for shipment to the battle fronts overseas.

"In supplying the East," he said, "two railway cars moving from the Middle West can haul as much oil as could three cars originating in Texas. Certainly there is ample reason for choosing the nearer source; certainly there would be no semblance of justice in permitting the people of the eastern seaboard to go too cold when their plight could be lightened by a sharing of supplies by the Middle West.

"It has frequently been protested that the Middle West can supply all of the heating oil that its own consumers care to buy and at the same time manufacture all of the fuel oil for which transportation facilities to move it elsewhere can be provided. It is true that the middle-western refineries could manufacture more fuel oil if they could be provided with more crude. But, with the exception of a possible but very small additional supply from Kansas no additional crude production is possible in the Middle West without dangerously wasteful operations which would greatly reduce the ultimate recovery. Additional crude cannot be shipped in from Texas and New Mexico because the pipe lines are operating at capacity and all available tank cars are needed for service to the undersupplied East.

"As a matter of fact, eastern refineries that are engaged in the manufacture of absolutely necessary war products are having great difficulty in getting sufficient crude to operate, so we have asked middle-western refineries to cut back their runs in order to free additional crude for eastern shipment. Oil-industry representatives in the Middle West have themselves agreed that such a step is necessary."

Mr. Ickes indicated that the Army and Navy had drawn heavily on East Coast stocks for the African campaign and may continue to do so. Saying that this requires greater sacrifices by the Middle West to keep the AEF supplied, he assured the Midwest that oil will not be plentiful there as long as present war conditions last and that currently full fuel-oil tanks will soon be drained, and urged them to convert to coal, giving them assurance as solid-fuels coordinator that there will be sufficient coal for the purpose. He insisted that the fuel-oil shortage was not due to official blundering but said that if steps had not been taken many months ago to find non-tanker transportation for the East and if it had not been for the hard work and cooperation of the oil industry the situation now would be much worse.

Higher Production in Kansas May Ease Fuel-Oil Shortages

WASHINGTON, D. C.—The factual basis for the necessity of fuel oil rationing was examined in detail by the Truman committee of the Senate December 5, the witnesses being Edward B. Swanson, director of research, and Robert L. Minckler, director of supply marketing, of the Petroleum Administration for War (formerly OPC).

Chairman Truman and other members of the standing committee to investigate the national defense program were particularly interested in all possible ways of increasing the amount of fuel oil which might be produced or transported to the rationed area, mentioning the closing of refineries in the eastern area, increasing crude production in Kansas, and speeding tank-car movements.

The hearings were a continuation of those held in Kansas City, Mo., and Oklahoma City, Okla., during the week, and the committee may call other witnesses on the subject of fuel oil and gasoline rationing within a few days.

The general attitude of the committee was expressed by Chairman Truman when he said:

"The public will cooperate in any rationing program that is shown to be really necessary and is operated on a common sense basis, but how can people operate under the complicated formulas and ridiculous questionnaires presented to them? The Petroleum Coordinator's office has tried to operate on a common sense basis and now that it has been set up as the Petroleum Administration for War with some authority it should be able to straighten out the confusion. I hope, I hope I hope."

The committee was particularly critical of the tank-car shipment of some 400,000 bbls. of crude per day to refineries in District 1 on the theory that there is a loss of 6 per cent in refining and if products were shipped instead of crude the same tank cars could deliver 24,000 bbls. daily above the present figure. The witnesses went into detail to explain why this 6 per cent shrinkage is offset by other factors and declared that crude is now going to only two eastern refineries not making petroleum war products. One of these is the Gulf refinery near Philadelphia which is using 10,000 bbls. daily in making war products and running at 30,000 bbls. a day, which is 50 per cent of its capacity, because it cannot operate efficiently at a lower rate. The other is the Cities Service refinery near Philadelphia which is making no war products and an attempt is now being made to close it down completely.

Committeemen were critical of the construction of petroleum war products refineries in the East at a time when a shortage of transportation was threatening, and suggested that the eastern refiners might have "sold a bill of goods" to OPC and that these plants should be closed and the war products made in the Gulf area. The witnesses replied that all refining capacity located on tidewater is needed for war products and there has been relatively little expansion in eastern refinery capacity for the purpose of making war products. They added that the operating rate of eastern refineries as a whole is now quite low and that all miscellaneous and specialty petroleum products produced by them are needed in the area.

Among the reasons why closing the eastern refineries would not permit shipment of 24,000 bbls. daily of fuel oil in addition to present deliveries, they cited the facts that much of the crude going to these refineries comes from pipe line terminals in Ohio, meaning a short rail haul, whereas there are not sufficient products available there and fuel oil would have to be moved from Texas; products tank cars would have to be fanned out instead of using refinery trainload terminals; tank cars of residual fuel oil would have to be heated instead of being loaded warm

E. B. SWANSON

R. L. MINCKLER

at the refineries; tank cars would have to be inspected for specifications both before and after shipping, thus causing delays in car turnaround.

Principal statistical data developed through questions put to Mr. Swanson were as follows:

There is no over-all shortage of crude oil in the United States at present, but there is a shortage in Districts 1 and 2 together. There is an over-all shortage of 39,000,000 bbls. of all grades of fuel oil in Districts 1, 2, and 3 for the 4-month winter period of December, 1942, through March, 1943, and stocks on November 30 were 19,000,000 bbls. below a year ago. East Coast refineries are operating below capacity, and 16,000,000 bbls. of fuel oil normally imported are lacking this year.

In terms of crude, District 1 last year consumed 1,800,000 bbls. of fuel oil daily and produced 80,000, or about 5 per cent. District 2 consumed 1,100,000 bbls. daily and produced slightly over 1,000,000 bbls., or about 10 per cent below demand. District 3 produced 1,500,000 bbls. daily and consumed only about 500,000 or 600,000 bbls.

For the four current-winter months the estimated demand is 845,000 bbls. daily, or 53 per cent of the total, for District 1, 473,000 bbls. daily or 30 per cent for District 2, and 280,000 bbls. daily, or 7 per cent, for District 3. The anticipated production of fuel oil by refineries in each district is 250,000 bbls. daily in District 1, 475,000 in District 2, and 500,000 in District 3. This means an over-all total shortage of approximately 39,000,000 bbls. of fuel oil, after allowing for some shipments from the Rocky Mountain region and some crude burned as fuel oil. There were 69,000,000 bbls. of all grades of fuel oil in storage November 30. This 39,000,000 barrel deficiency is the amount of demand estimated to be reduced by the rationing program.

The fuel oil rationing in District 1 and in 13 of the 15 states in District 2 is aimed at reducing of use of heating oils by 25 per cent below normal demand and is calculated to result in savings in light heating oil of 105,000 bbls. daily in District 1 and 52,000 bbls. daily in District 2. This is only about 10 per cent of the total demand for all grades of fuel oil of 1,598,000 bbls. daily.

The approximately 70,000 tank cars now in the East Coast service is about all that can be spared for this movement, but terminal and storage facilities are ample to handle more oil than is now being received, and one trainload terminal is being completed which can handle nearly 200,000 bbls. daily itself so the main hope for increased deliveries to District 1 is to cut down the travel distance. To move 800,000 bbls. daily to District 1 it is necessary to load one-third of the cars in District 2. At present some 200,000 daily are moving from District 2 but this must be increased by 50,000 to 75,000 bbls. daily, or roughly the amount of the curtailment in heating oil in District 2, and this is the reason for rationing fuel oil in the Midwest.

Crude production and refinery runs in District 2 should be maintained at the maximum, and studies are now being made to see if production in Kansas can be increased materially without seriously endangering ultimate recovery.

There are sufficient tank cars to take to the East all the fuel oil saved by rationing in the Middlewest. Essential oil needs of war plants will not be curtailed anywhere in the United States, but it will be difficult to supply fuel oil for any expanded production facilities, and new plants should figure on using other fuels.

The committee members asked particularly whether any agency had authority to prevent new war plants and Army camps in the shortage area from installing oil burning equipment and thus increasing the demand. The witnesses replied that since last April the War Production Board has prohibited the installation of oil-burning equipment in private buildings in District 1 but not in District 2, but that the Petroleum Coordinator has not been consulted by the Army and Navy on this problem.

Mr. Minckler reminded the committee that most of the consideration of the fuel oil situation has been from the immediate or short-term view, but in the long run the military demands for fuel oil are such that if the war lasts through 1943 and 1944 there will have to be much more severe rationing, and therefore it is extremely important to force conversion to other fuels by all means possible.

DEATHS

LESTER B. JEFFRIES, 52, district sales manager for Standard Oil Co. of California in the Los Angeles area, died suddenly last week. Mr. Jeffries had worked for Standard in Bakersfield for nearly 25 years, having been transferred to Los Angeles a year and a half ago. His widow and a son survive.

WILLIAM IRWIN, 53, secretary of General Oil Tool Co., Inc., died Sunday afternoon at his home in Wichita, Kans., after a brief illness.

JOHN WILSON O'DELL, 65, veteran Tulsa oil driller, died last week at his home, after an illness of 2 days. Mr. O'Dell came to Tulsa from Pennsylvania 22 years ago. He is survived by his widow.

CLARENCE C. WAGNER, 59, for many years an employe of Mid-Continent Petroleum Corp., and former resident of Tulsa, died last week at Pryor, Okla. He had been working in Pryor as a pumper. He is survived by his widow, a son, a daughter, and a stepdaughter.

KENNETH ALLEN JOHNSTON, 38, geologist and geophysicist, died at Los Angeles, Calif., November 13, following an abdominal operation. Following his graduation from University of Colorado in 1925, he was associated with Midwest Refining Co., Texas Co., George F. Getty Co., and for the past 7 years, has been with Buttes Oilfields, Ltd., Oakland, Calif. His widow survives.

Marketing Division Is Balance Between Consumers, Suppliers

By HENRY D. RALPH

This is the fifth of a series on the organization, personnel, and functions of divisions in the Office of Petroleum Coordinator which next week becomes the Petroleum Administration for War.

The series started in the issue of September 3 with a discussion of the overall functions of the entire organization. Similar reviews appeared September 10, October 1, and November 5 on the production, refining, and transportation divisions.

WASHINGTON, D. C.—Other functional divisions of the Office of Petroleum Coordinator are primarily concerned with industry problems, but the Marketing Division has to carry water on both shoulders in coordinating the essential needs of the consumer with the supplies which the industry can make available. The word "consumer" in this sense is broad, including the Army, Navy, and Allies overseas, as well as the individual car owners or householder who heats his home with oil.

The Marketing Division's chief task is to spread available supplies among distributors, dealers and consumers wherever shortages exist or are threatened. Naturally, this puts the division "in the middle" where it gets the squawks from both sides, and while the Office of Price Administration has taken over a lot of the complaints with regard to gasoline and fuel-oil rationing, the OPC Marketing Division still has to handle the multitudinous problems of the jobbers, distributors, retailers and large-scale consumers.

Prior to coupon rationing, the Marketing Division was known as the "complaint department," because of the bulk of letters it received from disgruntled motorists and chronic critics in general, as well as from sincere individuals seriously affected by the situation. Now that another agency is handling direct consumer rationing, the Marketing Division has been relieved of much petty detail. However, with the inauguration of nation-wide gasoline rationing, the division anticipates a large increase in the number of problems it must handle. Even before rationing, marketers' sources of supplies were a part of the division's worries, and in many cases represented serious problems.

Currently, the division is deeply engrossed, along with other OPC divisions, in setting up the machinery for assisting the industry in working out plans for the joint use, or more efficient use, of facilities, along the lines of Directive 59. While industry committees will handle much of this work, the Marketing Division will sit in to see that the arrangements treat all units on an equitable basis.

This problem of equitable treatment was one of the Marketing Division's biggest headaches when shortages first developed in the East. Big companies had their own sources of supply and methods of transportation and when tankers for coastwise shipment became scarce more than a year ago, many independent jobbers were threatened with starvation. These "orphans" were taken under the wing of the Marketing Division, and the majors were requested to divide up supplies with the independents.

One of the chief continuing tasks of the Marketing Division has been administration of the limitation orders issued by War Production Board on recommendation of OPC. Both L-56, relating to fuel oil, and L-70, relating to gasoline, were issued on March 14, 1942, and both have been revised and amended several times since then. When first issued, L-56 curtailed deliveries of fuel oil to dealers in District 1 and in Washington and Oregon by 50 per cent in order to promote conversion of oil-burning equipment to coal or other fuel.

Order L-70 curtailed gasoline deliveries to dealers first by 25 per cent, then by 33⅓ per cent, and finally by 50 per cent just before consumer rationing went into effect in the eastern area. It required 12-hour closing of service stations, and still curtails deliveries by 25 per cent to stations in the so-called "border zone" just west of the eastern rationing area, and by 33⅓ per cent in Washington and Oregon.

The drive for voluntary conversion of oil burners to use of other fuels has been handled by the Marketing Division. This campaign succeeded fairly well among industrial users in the East, but has not materially reduced the demand for domestic heating oils. A recent check showed that 1,100 industrial users in the East had converted, thereby eliminating the market for 26,669,000 bbl. of residual fuel oil per year; that 2,700 others could convert and save another 29,000,000 bbl. if they would do so; but that 5,500 industrial users could not convert for one good reason or another. The conversion campaign is now is being extended throughout the country, particularly in the 30 eastern states subject to fuel-oil rationing.

The conversion program is so far entirely voluntary, although Order L-56 gives WPB the power to deny deliveries of fuel oil to persons and firms who can use another fuel but who refuse to convert.

In its program to keep all distributors supplied with their equitable shares of petroleum products, the Marketing Division has worked closely with the industry, chiefly through supply and distribution committees. This procedure started in Washington and Oregon under Recommendation 29, issued January 14, and was applied to the East Coast under Recommendation 33, issued February 2, and now "S&D" committees are functioning in all five districts. These committees supply current figures, map out supply programs, and in some cases have arranged for the sale and exchange of products to meet local problems.

Among the other actions taken to safeguard the relationships between service-station operators and their suppliers was Recommendation 46, issued April 20 and amended June 10. This prevented the expansion of exclusive-dealer arrangements and prohibited the conversion of split accounts to exclusive arrangements.

The use of asphalt and tar for paving purposes was curtailed by Recommendation 45 in District 1 in April, extended to Districts 2 and 3 in July, and made nation wide in October. Under the recommendation, the use of asphalt or tar on public

Here are the men who run OPC's Marketing Division. Left to right, standing: Howard Cooper, chief of the Lubes and Containers Section; W. E. Avery, Marketing Counsel; D. C. Arnold, head of the Asphalt Section. Seated, left to right: Joseph H. Ellender, chief of the Administrative Section; Paul A. Best, assistant director; Robert T. Collier, director, and John H. Dockendorff, head of the Fuel Oils Section. John Downing, new chief of the Motor Fuels Section, and Hamilton H. Wende, head of the Facilities Section were absent

roads, streets and highways must be certified by the Public Roads Administration, and their use on private roadways or other surfaces for vehicular use subject to restrictions, including Army and Navy projects, must be approved by OPC's director of marketing.

To conserve storage facilities, transportation and technical manpower, the many grades and hundreds of modifications of paving asphalts and surfacing materials were reduced to 17 under federal specifications. This was achieved by Recommendation 61.

Materials Problem Acute

Getting supplies of critical materials to continue distribution operations has been a large problem for the Market Division. Conservation Order M-68-C, issued by WPB January 14, restricted the installation of marketing facilities and equipment to only the most essential operations, and Preference Rating Order P-98-b sets up the procedure for obtaining material for maintenance, repair and operating supplies. The Marketing Division passes initially on all applications for preference ratings to obtain supplies and equipment as well as for construction equipment in the marketing branch. OPC Recommendation 30, issued January 28, provides for the transfer of title to dispensing equipment to the operator or his authorized agent by the outgoing supplier in order to prevent undue mortality among service stations.

Scarcity of chemicals and metallic compounds used as additives in lubricating oils led the Marketing Division to issue Recommendation 40, on March 16, reducing the consumption of these materials by 25 per cent.

The container problem has been a constant nightmare to the Marketing Division as well as to the industry. Because of shortages of critical materials, the container branch of the WPB has been unable to give assurance that any particular type of container could be used at any given time in the future. As a result the industry has experimented with various substitutes for metal containers—wood barrels, fiber drums and pails, glass bottles and paper cans—but there is still no assurance that materials, or equipment to fabricate them, will be available for all container needs of petroleum distributors.

In line with a recent order of the Refining Division of OPC setting up standard specifications for gasoline, fuel oils and kerosene in the Atlantic Coast states, the Marketing Division is now making an effort to have these standards extended to the entire country for the duration. The division would like to see all products standardized as to specifications, for ease in exchanging products, under the pooling arrangement. While lubricating oil grades have not yet been touched by the standardization regulations, there is some work now being done in this direction, but no definite steps have been taken.

A recently inaugurated project of the Marketing Division is aimed at development of alternate uses for gasoline—once the principal product of the industry. Because gasoline consumption has dropped off so considerably, the division is working along three different lines to find new uses for motor fuel. They are:

1. Use of gasoline as tractor fuel.
2. Use of low-grade gasolines for diesel fuel.
3. Use of gasoline for manufacture and enrichment of gas.

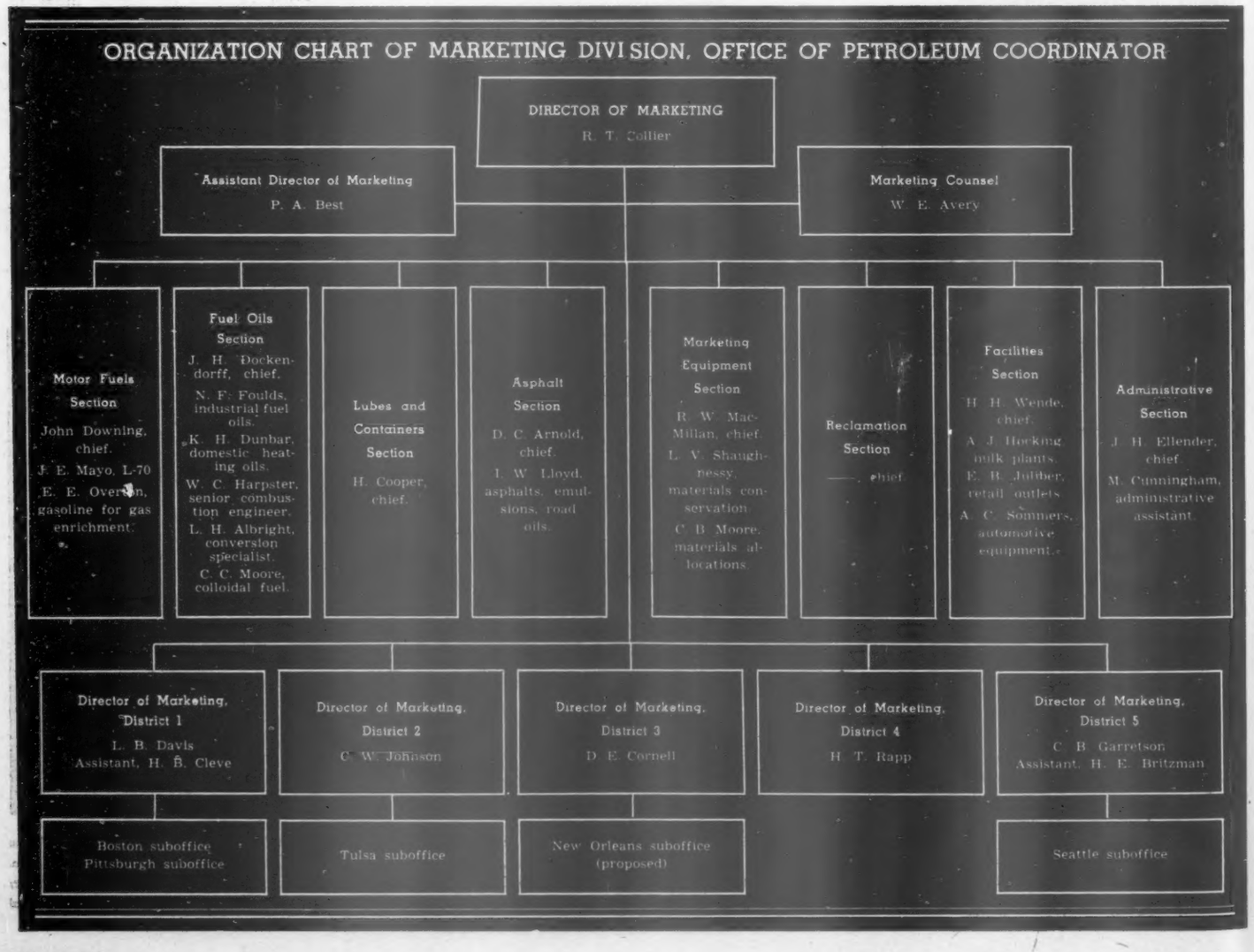
Because of the many increasing problems before the Marketing Division, it has recently undergone a reorganization, and now has eight sections instead of the four with which it originally started. In addition, it has appointed marketing directors in each of OPC's five district offices.

Decentralization Speeds Activities

Under this setup, all activities within each of the five districts will clear through the district directors of marketing, thus giving the industry quicker service on its problems by men who understand their particular local problems better than an administrator in Washington. Functions of the division—except those which necessarily must remain centralized—are being moved out to the district offices and suboffices as rapidly as possible.

Functions of Marketing Division sections are self-explanatory. For instance, the Marketing Equipment Section, not only will attempt to allocate available equipment among marketers, but is in charge of the conservation program on use, priorities and other phases of facility distribution.

The Reclamation Section, also newly organized, will consider all equipment for use in a program to divert it to other service in the marketing



field, to war use (such as Army tank trucks, storage, etc.), in war industries which need storage, valves, fittings, and other supplies, or, finally, for salvage, or scrap.

The Administrative Section has been set up to handle the general over-all problems of the division, and to furnish services for the other sections, such as statistical information, price information, and to handle personnel and other administrative problems. Joseph H. Ellender, head of the section, also will act in a position similar to that of an assistant to the director on administrative problems within the division.

Joint use of facilities, or "pooling" of facilities, will be the special problem of the Facilities Section.

Personnel of the division has been carefully chosen, with a view to drafting outstanding men in the marketing end of the industry. For instance, the director, Robert T. Collier, who succeeded Dr. John W. Frey in the position when the latter was appointed a special assistant to the deputy coordinator, has had nearly 20 years' experience as an oil marketer. He came to OPC on leave as vice president of Great Lakes Carbon Corp., and was previously with Shell Oil Co. as its West Coast assistant manager from 1936 to 1939. Mr. Collier started in the oil business with General Petroleum Co. in 1924, and handled marketing for the company in Washington, Alaska and British Columbia.

Started With Moffett

Paul A. Best, assistant director, began his oil-industry career in an unusual way. He was an assistant to James A. Moffett, vice president of Standard Oil Co. of California, when Mr. Moffett was in Washington as federal housing administrator back in 1934. When "Jimmie" Moffett went back to New York as chairman of the board of the California Texas Oil Co., Ltd., a subsidiary of the Standard Oil Co. of California and the Texas Co., Paul went with him, and has been in the oil business, both foreign and domestic, ever since.

John Downing, chief of the Motor Fuels Section, came to OPC only recently from Louisville, where he served as a director for the Standard Oil Co. of Kentucky.

After serving as an ensign in the U. S. Navy in 1918 and 1919, Mr. Downing went to work as a laborer in the Louisville refinery of the company, coming up through the ranks of pipe fitter, stillman, and auditor, until in 1924 he was transferred to the company's district office at Savannah, Ga., as chief clerk and office manager. Later he went to Jacksonville, Fla., as district manager for the eastern and northern section of the state.

In 1938 he returned to Louisville as special sales manager, and in 1940 he became district manager for the State of Kentucky. He was elected to the company's board in March this year.

The new chief of the Fuel Oil Section, John H. Dockendorff, has just come with the division on leave from T. A. D. Jones & Co., wholesale fuel-oil marketers of New Haven, Conn. He has had 20 years' experience in the industry. He has been with the Jones company for the past 8 years. He succeeds Ned Foulds, who will devote his entire time to industrial fuel-oil conservation problems.

Howard Cooper, head of the Lubes and Containers Section, came to OPC from Sinclair Refining Co., where he was chief lubrication engineer in the domestic lubricating sales department. He had been with Sinclair for 18 years, and prior to that with Texas Co., also as a lubricating engineer.

D. C. Arnold also comes into the government service with a long record of service in the field he will handle. He was with Texas Co. for 15 years as a representative in the asphalt sales department, during which period he covered the Midwest, South and Atlantic seaboard.

R. W. MacMillan, chief of the Marketing Equipment Section, had more than 30 years of oil-marketing experience. After attending Harvard University, Mr. MacMillan, a resident of Brookline, Mass., joined Socony-Vacuum (then Standard of New York) in 1908, and served successively as clerk, station agent, salesman, auditor, district manager, division sales manager, division operating manager, and in other capacities, all in New England. He took time out in 1917-18 to serve Army engineers as a sergeant, and when he left the Army he was a captain.

After his resignation from Socony-Vacuum in 1938 he headed the Oil Jobbers' Institute in Boston, and came to Washington from that post in 1941. He was first connected with OPACS in the Civilian Supply Branch, but later went over to OPC in February of this year.

H. H. Wende, a native of Buffalo, N. Y., has been manager of the Buffalo district for the Texas Co. for 8 years. Prior to that he was president of the Goodyear-Wende Oil Corp., a company which he was instrumental in organizing in 1920. The company was purchased by Texas Co. in 1933. He was with the AEF from 1917 to 1919 as a first lieutenant in the Quartermaster Department, especially interested in petroleum products.

Head of the Administrative Section is Joseph Ellender, who had 13 years of oil experience before joining OPA in May last year. Prior to 1936 he worked for Gulf, Humble, Shell and Crown Central, gaining experience in all branches of the industry. From 1936 to 1941 he was analyst for Lehmann Corp., New York, specializing in petroleum economics.

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Montana Purchase Expands Jersey Operations to West

FIRST operated producing and refining properties in the western states were in process of acquisition this week by Standard Oil Co. (New Jersey) which has agreed to exchange 83,333 of its shares for 3,500,000 shares of Northwest Refining Co. of Montana.

Under terms of a preliminary agreement, Standard of New Jersey will acquire all assets of the Santa Rita Oil & Gas Co. of Cut Bank, Mont., including wholly owned subsidiaries, Northwest Refining Co. and the Santa Rita Purchasing Co. Assets of the Santa Rita companies are to be consolidated in the Northwest Refining Co.

Santa Rita's producing properties include approximately 2,100 bbl. daily output from 85 wells and 3,200 developed acres in the Cut Bank field of northwestern Montana. Other holdings include 20,000 acres in Cut Bank, 10,000 in the West Kevin district, 6 miles of oil line, 10 miles of gas line, 3 gas wells and 97 bulk plants and retail outlets.

Northwest's refinery at Cut Bank is currently processing 3,500 bbl. of crude daily. The company's marketing territory for a full range of petroleum products extends from North Dakota to Spokane, Wash.

Announcement of the transaction was made jointly by Louis B. O'Neil, president of the Santa Rita companies, and L. F. McCollum, Tulsa, acting for the Jersey company. Mr. McCollum is president of the Carter Oil Co., Standard's producing subsidiary in the Midwest.

The plan of reorganization provides for the preliminary transfer to Northwest of all the assets of Santa Rita, except: (1) the stock of Northwest which is now owned by Santa Rita and (2) the stock of another wholly owned subsidiary, Santa Rita Purchasing & Storage Co. Santa Rita will cause all assets of Santa Rita Purchasing & Storage to be transferred to Northwest which will assume the obligations of the liquidated purchasing company and the latter will be dissolved. Northwest Refining Co. was originally incorporated in Montana in 1926, under the name of O'Neil Brothers, Inc.

When the transaction is consummated, it is considered probable that operation will be assigned to Carter Oil Co., and it is understood that marketing functions will be continued indefinitely under the name of Northwestern and existing brands.

Western expansion both of producing and refining activities marks a sharp departure from previous spheres of operations by the parent company, subsidiaries and affiliates. Carter Oil Co. has held nonoperating interests in certain Wyoming properties for several years but the Montana purchase is the first wholly owned entry into Rocky Mountain and Pacific Coast territories by Standard of New Jersey interests.

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Only Two Members Of Original Cole Committee Left In House

WASHINGTON, D. C.—When the Seventy-eighth Congress convenes next month, only two members of the Cole oil subcommittee who have

C. L. LEA

L. H. BOREN

served during the current session will be present.

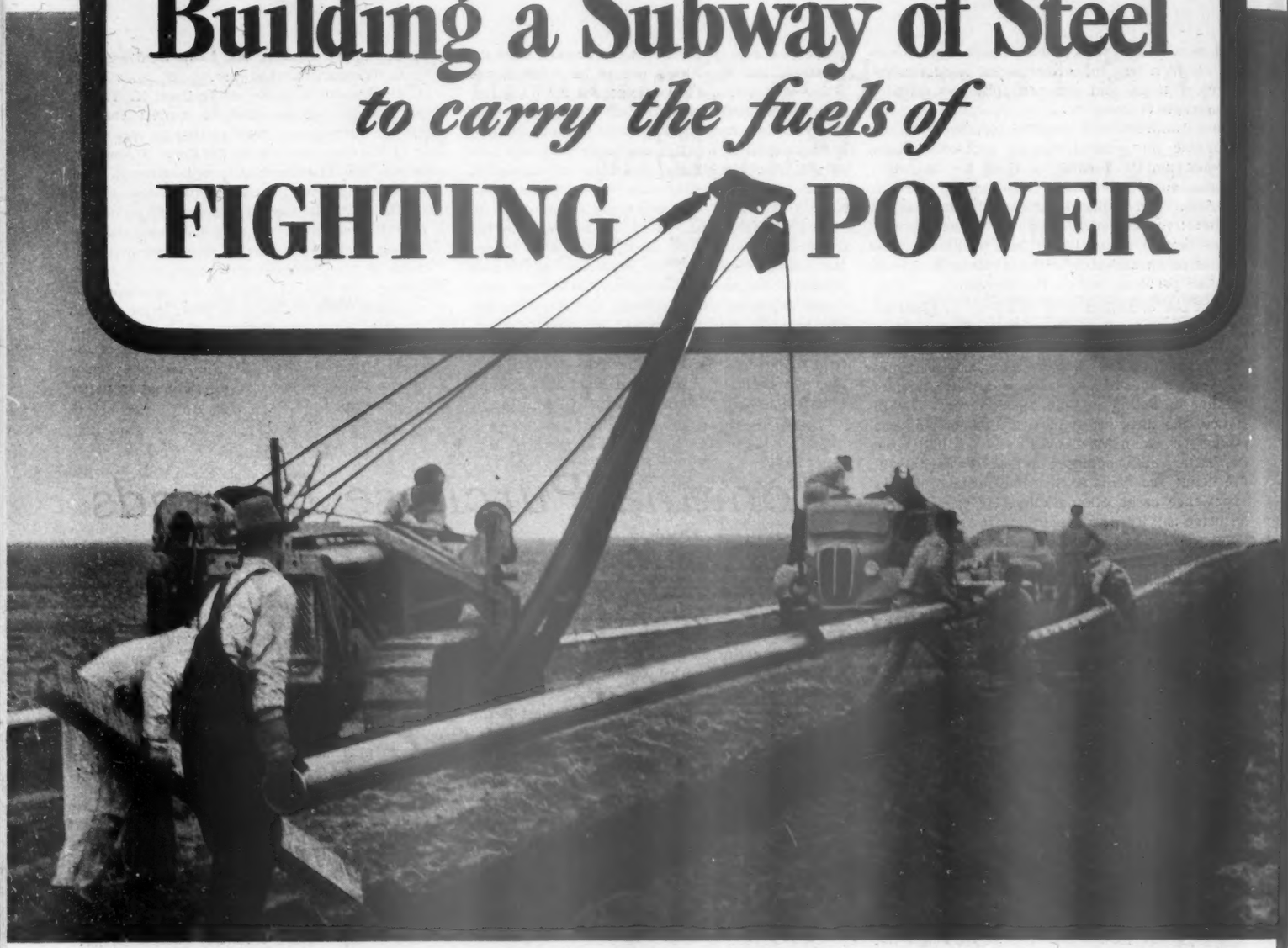
Already the resignation from Congress of its long-time chairman, Rep. William P. Cole, Jr., and the retirement of Rep. Herron Pearson, have brought about two changes in membership of the five-man committee. A third member of the group, Rep. Ed Kelly, was defeated in the recent elections, and will not be back in January.

Rep. Clarence L. Lea, California, chairman of the House interstate commerce committee, of which the Cole subcommittee is a part, has taken over its chairmanship, at least until after the new Congress convenes. Rep. Lyle H. Boren, Oklahoma, has been appointed to take the place left vacant by Representative Pearson's retirement.

The committee will probably be reorganized in January, when a new member will be appointed to take Mr. Kelly's post.

The two remaining members are Rep. Charles A. Wolverton of New Jersey, and Rep. Pehr G. Holmes, Massachusetts.

Building a Subway of Steel
to carry the fuels of
FIGHTING POWER



Victory demands more Oil, Gasoline and Gas to build up the striking power of our war machine. And for fast, safe and uninterrupted conveyance of these vital war fuels from flowing wells to fighting action, you can't beat pipe lines—subway transports of Steel.

The broader our network of pipe lines, the faster our Army, Navy and Air Corps will hit the peak of fighting power—the sooner our industries will reach full-out Production for Victory. And that, like so many other war efforts, depends on Steel.

Republic—one of the chief fabricators of electric weld line pipe, casing and tubing, of alloy and stainless steels—has planned a lot, worked unceasingly, spent millions of dollars to meet war needs. Our tens of thousands of workers in 65 plants and mines have relentlessly pushed tonnage figures to unbelievable totals. New furnaces, new plants, new manpower have been added—and we'll keep on growing until Victory is won.

Here at Republic we know how important Steel is to Oil and Gas. So whatever it takes to fill your needs, Republic will spare no time or effort to supply it.

There are reasons for every advantage of Republic electric weld line pipe, casing and tubing. You'll find them in the exclusive Republic production processes which are visualized in "The Pipe of Progress," an unusual 44-page book of facts. Ask us to send one.

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S.A.E. Learns How Equipment Is Repaired by Metallizing

THE Southwest Society of Automotive Engineers group, 100 strong, watched a worn shaft built up by spraying molten steel on it, and listened to a discussion of practical methods for repairing worn oil-field and plant equipment and keeping it operating, at the Mayo Hotel, Tulsa, December 4. Charles K. Stipp, western manager for Metallizing Engineering Co., Inc., presented the methods developed by that company for rebuilding used equipment, a subject of critical interest to the oil industry now.

Profusely illustrating his talk with slides of metallizing equipment and methods for accomplishing various jobs, Mr. Stipp showed how a worn pump shaft, for example, may be undercut over the worn section, the undercutting filled with molten metal by spraying with a metallizing gun to a slight oversize, and the shaft machined to size to put it back on the job. The gun used to do this spraying is arranged to feed metal wire at constant speed through a nozzle, comes into contact with six small oxyacetylene or oxyhydrocarbon flames impinging on the tip of the wire. The wire is melted continuously, and is blown with considerable velocity by compressed air against the surface to be rebuilt, gradually building up the section to 1/32-in. oversize, which excess metal is machined off to exact size by grinding or turning on a lathe, in the case of a round shaft, polished, and the shaft thus made ready for service again.

The crucial factor in making a good repair is proper preparation of the surface to be rebuilt, Mr. Stipp stated. After undercutting the article, the surface is roughened by sand blasting, roughthreading, knurling or by cutting with a special tool used in the Metco method. The last method is to undercut the surface at an angle to prepare a surface which forms hooks or bindings for the metal added to effect a solid strong bond between base metal and sprayed metal, without which the job is not satisfactory. Mr. Stipp recommended the last-mentioned method as making the best type of repair.

Regarding the cost of metallizing, the speaker itemized the different factors. For any given job the greater cost of acetylene is offset by the greater cost of oxygen used when propane or butane is used as fuel, so that the entire costs, not counting overhead, etc., are almost identical. Propane fuel deposits metal faster, and the final result is that the operator may use the fuel which is most convenient to obtain and use.

The compressed air used in this system must be very dry, and in some cases a dehumidifier unit is necessary in the air line. Speeds and feeding rates must be controlled within certain limits, propane requiring less exact control than does acetylene. At the ends of the rebuilt section the edges are dovetailed or undercut to tie the sprayed metal coat into the base metal for a better bond. The advantages of acetylene as fuel were mentioned as:

Cleaner flame, with less dust.

More uniform coating results.

Better atomization and better structures with nickel and nickel-chrome alloys.

Higher hardness of carbon steels, with equal machinability.

Propane shows advantages as follows:

No pressure restrictions.

Good flame stability.

Less sensitivity to pressure changes.

In repairing a group of 1-in. shafts in rebuilding a dozen or more at a time the time required is about 20 minutes per shaft and the cost is 68 cents each. A brake camshaft costing $11.40 new is repaired at a total cost of $1.48, using 0.80-carbon steel wire. Crankshaft journals are rebuilt to last 100,000 miles or more. One interesting property of the sprayed metal is that because of its porosity it operates with lower friction losses since it absorbs lubricant to a relatively high degree.

Cracks in cylinder heads, shafts, etc., are built up and repaired satisfactorily at a small percentage of the cost of new articles. One company reports a saving of $865 in repairing shafts of motor armature bearings. For example, a few hundredths of an inch of babbitt bearing surface may be backed by one-eighth or more or less of carbon or alloy steel to build a new bearing where commercial bearings are not obtainable or where the critical babbitt material is obtainable in very small quantities. Bushings worn too large for the job may be swaged to size and the whole outside rebuilt with steel or other metal to meet outside-diameter dimensions. Bronze bushings which cannot be replaced may be repaired in this way, backing the bronze with an outer steel ring to fit the required dimensions.

Consolidated Oil Corp. Buys Terminal Refinery in Texas

Sinclair Refining Co., manufacturing subsidiary of Consolidated Oil Corp., will assume operation of the Terminal Refining Corp., Corpus Christi, Tex., December 15, it was reported this week. Consolidated's purchase of Terminal Refining Corp.'s 12,000-bbl. plant at Corpus Christi was confirmed by New York headquarters of the buyer.

The Mar Pipe Line Co. with all properties in the Corpus Christi district was also acquired by the Consolidated interests.

Terminal Refining was well advanced on a 100-octane plant under contract with the Defense Plant Corp. when the sale was consummated and this will be assumed by Sinclair and carried to conclusion.

Natural Gas

Louisiana-Tennessee Gas Line Hearing Reset December 15

NASHVILLE, Tenn.—Application of the Tennessee Gas & Transmission Co., Chattanooga, Tenn., for permission to construct and operate a natural gas pipe line from southwestern Louisiana to eastern Tennessee will be submitted here December 15 before the Federal Power Commission. The hearing was originally scheduled December 8 in Washington. Postponement and change in place were announced last week by FPC.

In addition to rendering full service to the Tennessee Valley area, applicant states that with a single compressor station the proposed line could make 100,000,000 cu. ft. of gas per day available for transmission into Ohio and Pennsylvania to relieve a threatened gas shortage in the Appalachian area, and that with full compression not less than 200,000,000 cu. ft. could be delivered daily to companies in the critical area.

The proposed pipe-line system will consist, according to the application, of gathering lines to transport natural gas to a point of convergence near Eunice, La.; a main line, 24 in. in diameter, to transport the gas through Louisiana and Mississippi to a point near Muscle Shoals, Ala., and thence to Brace, Tenn. From Brace, two main lines will diverge, one of which, either 16 or 24 in. in diameter, will transport gas to a point near Nashville, Tenn., and the other 12¾ in. in diameter, will carry gas to a point near Alcoe and Knoxville, Tenn. The construction of lateral lines to reach aluminum and chemical plants in Tennessee, certain plants of the Tennessee Valley Authority in Alabama and Tennessee, and the cities of Nashville, Knoxville, and Chattanooga, Tenn., is also contemplated. Construction of numerous lateral lines originally proposed to be built to serve many other communities and industries in the Tennessee Valley and western North Carolina must necessarily be postponed until after the war emergency, according to the application.

The proposed system is represented to have a delivery capacity, without any compression, of 155,000,000 cu. ft. per day, and with one 5,000-hp. station located 282 miles from the beginning of the main line, the capacity of the line can be increased to 204,000,000 cu. ft. per day, the applicant says. With compressors at intervals of 94 miles, the available capacity at Brace, Tenn., can be increased to approximately 300,000,000 cu. ft. per day, it is claimed.

The application contends that since the gas supply for the proposed system will originate in the "distillate fields" of southwestern Louisiana, and since the heavier hydrocarbons necessarily produced with such gas will have to be removed from it prior to delivery to applicant's pipe line, the consummation of the project would immediately afford to the war program a new supply of motor and aviation fuel amounting to from 72,000,000 to 108,000,000 gal. annually, based on a recovery ratio of about 1,000 gal. of natural gasoline for every 1,000,000 cu. ft. of natural gas.

The FPC has authorized the Department of Public Utilities of Arkansas the Louisiana Public Service Commission, the National Coal Association and the Southern Appalachian Coal Operators' Association to become interveners and parties to the proceedings.

Natural Gasoline

Consumers Urged to Fill Butane, Propane Storage

WASHINGTON, D. C.—Joint action of government agencies was taken last week to increase the inventory of butane and propane liquefied gases in the tanks of consumers to avert a winter shortage for these fuels for the armed forces.

The public is asked to cooperate with the armed services by filling all available storage facilities now so that total reserves of butane and propane gases may be sufficient to provide for civilian needs during the winter without unnecessary interruptions of deliveries for military and industrial purposes.

Farmers, business places, and household consumers cannot longer safely buy on a hand-to-mouth basis, nor can they rely on regularity of deliveries during the winter, the War Production Board announced.

LIBERTY versus Compulsion

We are engaged in the greatest war in history—to determine whether our nation and other nations founded on liberty and the dignity of the individual shall endure.

The struggle is between two totally opposite ideologies. One is based on brute force, the top gang keeping its power by compulsion. The other is based on logic and persuasion, the leaders obtaining office by vote and remaining there only by the consent of the governed. Under regimentation creative research congeals and the masses produce and fight as sullen slaves. Under democracy creative research is stimulated and mass production multiplies. Soldiers go to battle with unbeatable spirit because of the determination of free men to maintain that priceless gift which they have won after ages of fighting and which they will never give up . . . the gift of liberty.

When the war is won and we return to peace time pursuits there will still be a big job to do in rehabilitating a broken world. People everywhere will look to America. Our business men and leaders will have a great responsibility and a great opportunity. In keeping with this thought the Mission Manufacturing Company is planning many advancements and improvements in its products for the benefit of oil men who will be busy to a degree never before experienced. In the meantime war comes first.

Buy Bonds for Victory

and to insure a strong and stable United States when the war is over.

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HUMBLE ROAD HOUSTON, TEXAS

MANUFACTURERS OF:
Mission Slush Pump Valves—Mission Slush Pump Pistons
—Mission Piston Rods—Mission Gland Packings—Mission
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ENGINEERING *and Operating* SECTION

Drilling-Rig Functions Logged By Automatic Instruments

By HARRY F. SIMONS

The drilling industry is in a transient stage from practically no instruments to one of complete logging of all the primary functions. The objective is to record the information which makes possible the saving of time and money.

This article describes the automatic logging of 13 factors affecting drilling operations.

THE study of drilling-rig operations and the development of methods to increase the rate of penetration and reduce the drilling costs has been prevented, to a certain extent, by the lack of suitable instruments for automatically recording the necessary data. The picture has been changing in recent years and there are now available instruments for automatically recording weight on the bit, revolutions per minute, torque on the drill stem, mud pressure and the rate of penetration.

One major oil company has gone a step further and combined, in a single unit, the instruments necessary for recording the 13 items which affect the drilling operations. In addition to those mentioned above, the level of the mud in the pit, the time required to circulate the fluid from the bottom of the hole to the surface, the oil and gas content of the mud, the pH, conductivity, viscosity and specific gravity are recorded. The trailer housing the unit also includes equipment for other mud tests and core-analysis work.

At the present time this unit is located on the Louisiana Gulf Coast, making studies on wells approximately 8,300 ft. in depth.

The arrangement used is unique in that standard rig instruments are connected into the recording instrument. In other words, the regular weight indicator used at the rig is not replaced, but its reading at specified time intervals is recorded. The same is true of the pump pressure, torque and rotary speed and the rate of penetration. Special instruments were developed for the automatic recording of viscosity and specific gravity of the mud and the delay time (time of circulation of the mud stream).

The torque is obtained from steam pressure in the engine manifold, the revolutions per minute of the rotary from a tachometer, and pump pressure is obtained from the mud-pump pressure gage but a stroke counter is to be added, rate of penetration is recorded by the selsyn motor method, the gas per cent in the mud is taken from a sample run into the trailer, viscosity of mud from an automatic viscosimeter, specific gravity from an automatic and continuous weighing device, and the pH, oil content, and conductivity of the mud are obtained from a small sample stream.

All the data are recorded on two Micromax instruments. The one instrument records rate of penetration, weight, revolutions per minute, torque, pump pressure and depth of fluid in the pit. The other instrument records the mud conditions, including per cent of gas, parts per million of oil, pH, conductivity, viscosity, specific gravity and delay time. The instruments are driven by current from a small generator direct driven by a small engine.

The traveling chart is the usual 10 divisions to the inch, with the vertical scale being time and the horizontal scale being required units for measuring each particular function. A complete recording cycle is made each 2 minutes by the instruments. The traveling pen makes a dot on the chart, showing the reading of the instrument for determining one value, and then moves to another position for recording a different factor. On arriving at its new position, it is allowed 20 seconds to assume a stationary position. After this time delay, a mark is made and it moves to the proper position for recording the next factor.

After it has recorded all six or seven of the various functions, it is allowed 40 seconds in which to return to the original starting place and repeat the cycle.

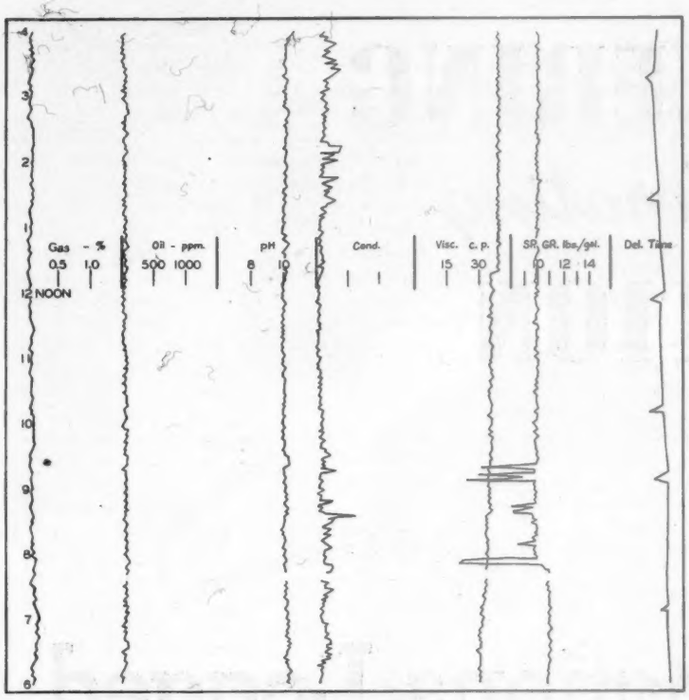
The chart thus obtained is a series of dots, but they are so close together as to be almost a continuous straight line as each 1/10-in. vertical travel will have three dots in each column. Sample charts are shown in Figs. 1 and 2.

Essentially this work differs from the familiar well-logging method in that the information is being gathered for drilling purposes rather than oil finding and hence all items are recorded on a time basis rather than a footage or depth basis. The use of the oil analyzer is to show whether the rate of penetration increase can be expected when oil is in the formation. The conductivity of the mud shows when there has been any swabbing of the hole which allowed salt water to move from the formation into the drilling fluid.

The unit is strictly an experimental one and is intended for the gathering of information to determine just what type and construction of instruments are needed on drilling rigs to enable the driller to make faster hole.

Information Obtained

The information obtained at the well is plotted on a graph, sample of which is shown in Fig. 3. This shows depth, formation, bit record, weight on bit, rate of penetration, table speed, mud-pump pressure, casing landed, electric log of the well, torque, velocity through the jets in the bit, the neutral point in the drill pipe and an accumulative time chart. These are all recorded manually on graph paper having 20 divisions to the inch. The velocity through the jets is calculated from



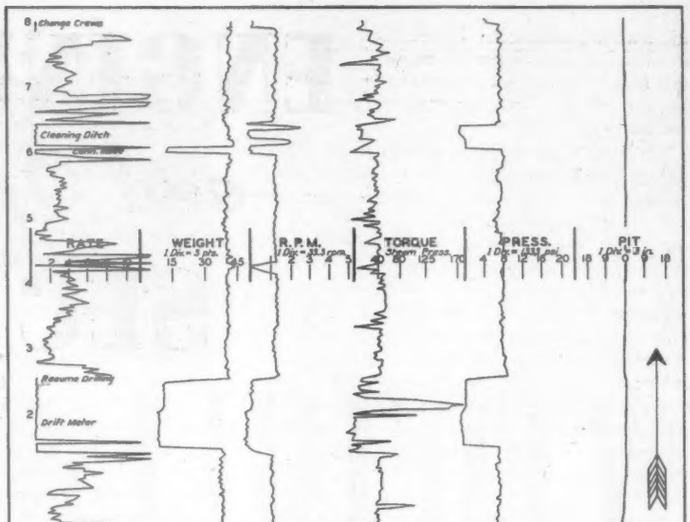


Fig. 1 (left) shows the results of mud logging as performed at the well, and the seven functions recorded. Fig. 2 (above) shows the record of drilling data as made at the well and the six functions logged

the jet diameter and the volume delivered by the pump. Neutral point in the drill stem is determined from the weight per foot of the drill pipe and drill collars and the weight-indicator reading. Provisions are made for charting other data affecting the drilling operation. Type of formation is logged by the driller with a number-letter system being used. In the illustration *C*-4 is hard shale, *E*-2 is sandy shale and *D*-7 is shale.

A study of these charts has proved some theories previously advanced and has shown several new factors formerly overlooked. The porosity, as shown by the electric log, correlates quite nicely with the rate of penetration. It has also been found that the neutral point in the drill stem, which is considered of primary importance in the elimination of drill-pipe trouble, is consistently in the drill pipe and not in the drill collars.

Outstanding is the demonstration of the fact that drillers always apply less bit weight while going through a formation having a high rate of penetration than they do while drilling through the harder formations. In other words, as soon as a soft spot is encountered, a driller has a tendency to hold up on the bit. By encouraging drillers to keep the bit weight more even, a reduction in drilling time has been effected.

Torque

Torque may be a sensitive indicator of the drillability of a formation. On a steam-powered rig the installation of a torque indicator is a simple matter, but it is more complicated on the ordinary mechanically driven rotary. Electric rigs can be easily equipped with torque indicators. As soon as the torque necessary to rotate the drill stem fell off, the driller would immediately apply more speed or weight, or both, to maintain the torque at a specified value. By taking advantage of the "breaks" and making as rapid progress as possible through the easily drilled formations, the over-all time required to drill a well may be substantially reduced. Such an instrument could be combined with the present weight indicator to make the driller's efforts more effective.

By careful recording of the make and type of bit used and the formation drilled, a gage of performance can be obtained. As the record also includes the pertinent factors affecting bit operation, there will not be a danger of comparing bits under dissimilar conditions.

Primarily, the whole program is designed to accomplish two objectives:

1. A reduction in the time and expense of drilling wells;

2. A quantitative determination of the effect of various factors on drilling rig performance.

The two programs go along simultaneously,

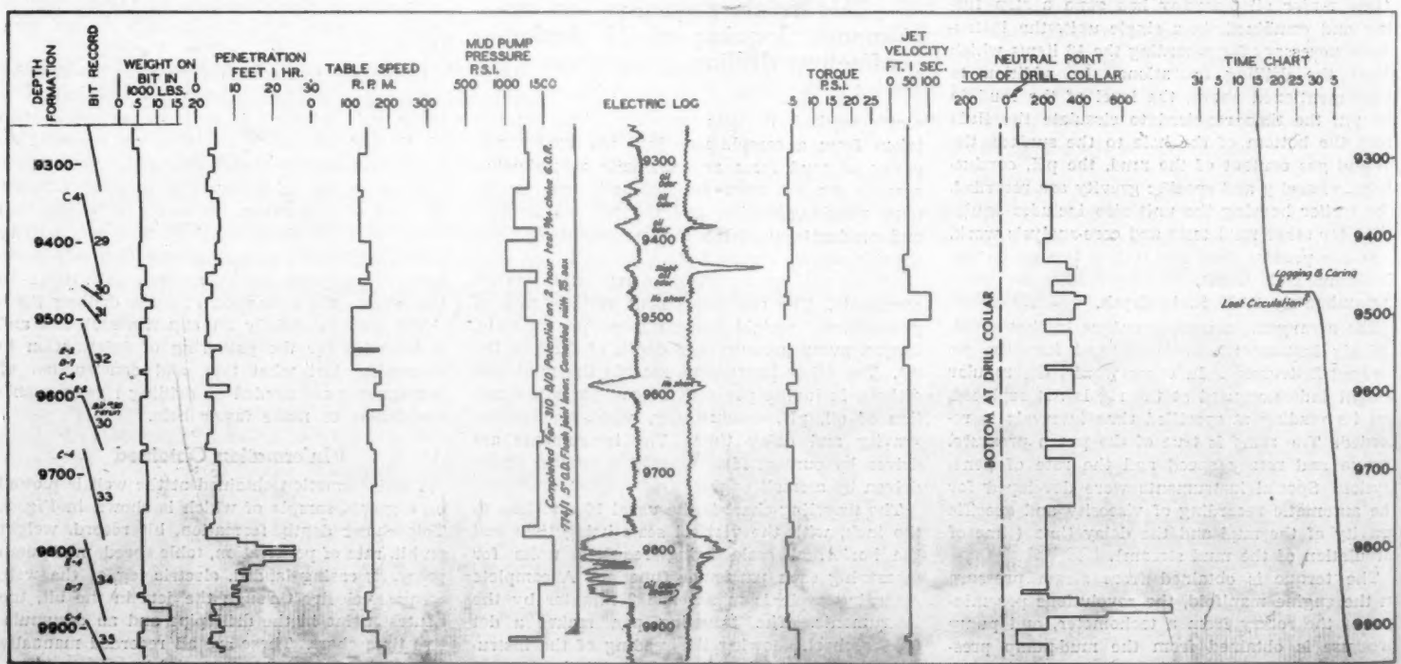


Fig. 3—Well record shows additional data secured at the well

and both are affected by a third factor, the human element, which is hard to evaluate. The second objective includes the determination of what new instruments and what changes in old ones are necessary.

Outlining a bit program and the suggestion to maintain the weight on the bit while drilling through the more easily penetrated formations has already shown results. The first well drilled showed an average factor of 15.7 per hour with 25 bits (rock and drag) being used; the second well showed an average of 19 ft. per hour and required 15 bits (rock and drag). The third well had an average of 21.6 ft. per hour and required 19 bits (rock and drag).

Already the work done shows the necessity for taking into consideration the rig time and the time required to make trips in evaluating the merits of a bit program. A minimum rig time and a minimum expenditure for bits are the objectives.

Many of the phenomena associated with drilling can still not be evaluated quantitatively and until this is possible, the way to further substantial reductions in drilling costs is practically barred. The effect of increasing the weight on the bit is generally one of increased penetration and the same can be expected from increasing the speed of rotation. However, this is not always the case and the determination of the exceptions, and when weight or speed, or both, should be reduced are important points.

Effect of Vibration

Previous work along this line has shown that at certain speeds there is a dimunition in the rate of penetration which is undoubtedly due to the effect of drill-stem vibrations. A study to determine where in the speed range this occurs is not only important from a rate of penetration angle, but also for the purpose of preventing equipment failure. A recording vibration analyzer is being built to study drill-stem vibrations and this equipment will be included in the regular equipment in the trailer.

The neutral point in the drill string is likewise extremely important in the prevention of drill-pipe and drill-collar failures. Much trouble has been experienced with joint failures when running multiple drill collars (over three 30-ft. sections) and it may be possible to eliminate much of the difficulty by close control of the point where the stress condition in the drill stem changes from one of tension to that of compression.

The effect of varying the velocity of the mud stream through the jets in the bit is another factor for which an entirely satisfactory answer has not been obtained. When drilling certain types of formations, a high jet velocity may be desirable; other formations may require less jet velocity and a greater velocity in the annular space.

At the present time, the program of studying the functions of a drilling rig is just getting under way, and it will be a considerable time before sufficient data are available to provide a quantitative answer to many of the present-day questions.

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Butane Pump-Station Equipment

By PAUL REED

AFTER 2 years of operation, the station equipment of Magnolia Pipe Line Co.'s 186-mile butane line continues to be unique as a development of the industry. During this time the company's successful experience with installations representing distinct departure from customary practices, has corroborated decisions made when the project was designed for the butane service in which it is engaged.

Left: Variable stroke, triplex pump under shelter without walls

Below, left: Pneumatic controls for plug valves at base of spherical tanks are manipulated at office at right

Below, right: Natural-gas-line connections provide for maintaining vapor safely in spherical tanks

The variable-stroke, triplex pumps used at the two pump stations have the advantages of both reciprocating and centrifugal types, operate with the plunger stroke varying according to the pumping load, without requiring any change in the speed of prime movers.

Storage Tanks

At the first station on the line, butane is received in two spherical tanks in which pressures are normally maintained between 25 and 71 lb. A relief valve opens when a pressure of 72-73 lb. is reached. Since it is important to avoid having air in the tanks, or to reach a critical vapor pressure of the liquid, natural gas from a nearby gas system enters the tanks when one is emptying faster than the other is filling. A certain amount of balancing of vapor in the two tanks is accomplished by a connecting line. At present a new hookup with the gas system is being considered which would eliminate venting to atmosphere, because of excess pressure (above 75 lb. per sq. in.) and to eliminate the use of natural gas.

Plug valves at the tanks can be manipulated either by hand or by remote control from the station office by means of pneumatic equipment. Small valves can be closed in this way within 3 and 4 seconds; large valves can be closed within 12 and 15 seconds.

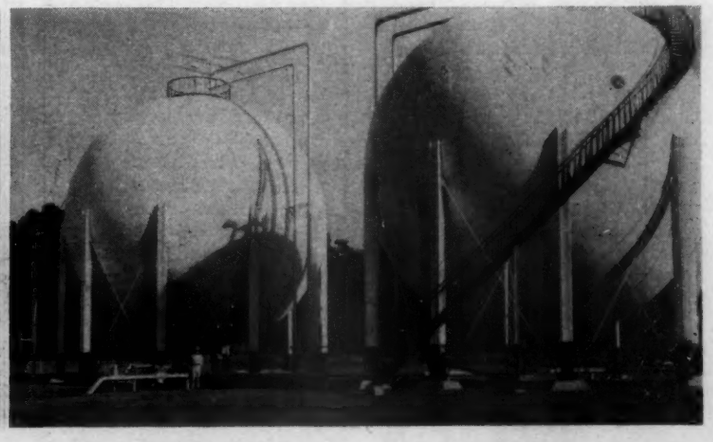

Chart Facilitates Determination of Tank Capacities

THE accompanying illustration shows two simple charts for determining the capacity of vertical tanks, prepared by Louis T. Monson, research engineer of the Tretolite Co. of California. Use of these charts simplifies the problem and obviates the use of tables.

To determine the capacity of any tank whose internal diameter lies between 8 and 55 ft., use the three left-hand scales shown. Lay a straightedge from the point on the internal diameter scale which represents the desired tank diameter to the point on the height scale which represents the desired tank height. Read the capacity of the tank of those dimensions on the capacity scale. To determine the capacity of any tank whose internal diameter lies between 55 and 170 ft., use the three right-hand scales, proceeding as before.

(Continued on Page 53)

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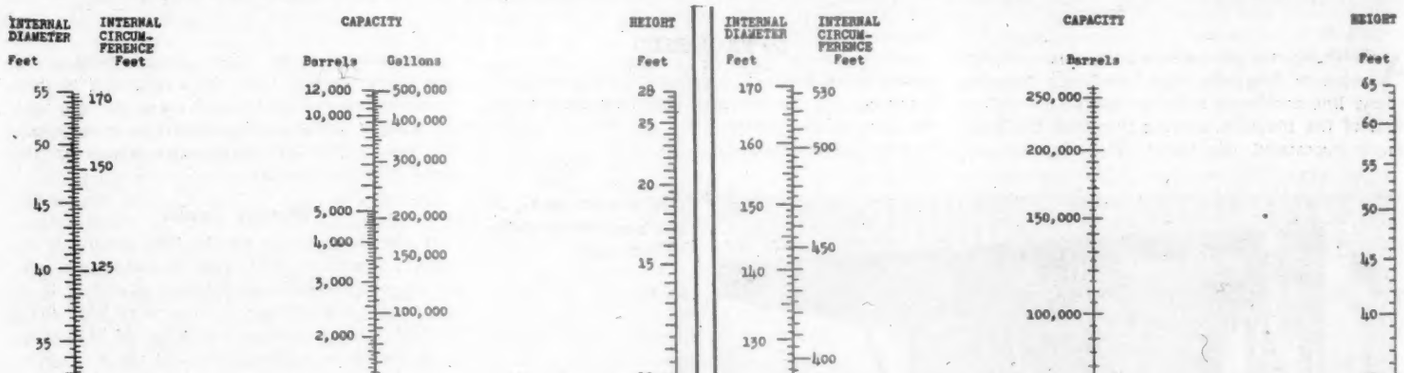
APPROXIMATE CAPACITIES OF RIVETED TANKS (BARRELS)

72-in. Courses

Diam. (ft.)	Circum. (ft.)	Nominal height (ft.) 11.8	17.6	23.4	29.2	34.9	40.7	46.4	52.1	57.8
12	37.7	240	360	480	590	720	.....	.....	.....	.....
18	56.5	540	810	1,070	1,340	1,600	.....	.....	.....	.....
24	75.4	960	1,440	1,910	2,380	2,850	.....	.....	.....	.....
30	94.2	1,500	2,240	2,980	3,710	4,450	.....	.....	.....	.....
36	113.1	2,140	3,190	4,240	5,290	6,330	7,380	8,410	9,440	10,500
48	150.8	3,800	5,670	7,540	9,410	11,300	13,100	15,000	16,800	18,600
60	188.5	6,040	9,000	12,000	14,900	17,900	20,800	23,700	26,700	29,600
78	245.0	10,000	15,000	19,900	24,900	29,700	34,600	39,500	44,300	49,200
102	320.4	17,200	25,600	34,100	42,500	50,800	59,200	67,500	75,800	84,100
120	377.0	23,800	35,500	47,100	58,800	70,300	82,000	93,500	105,000	116,000
144	452.4	34,200	51,100	67,900	84,700	101,000	118,000	135,000	151,000	168,000
168	527.8	46,000	69,000	91,000	114,000	136,000	159,000	181,000	203,000	225,000

100-in. Courses

Diam. (ft.)	Circum. (ft.)	Nominal height (ft.) 16.3	24.4	32.5	40.6	48.6	56.6	64.7
36	113.1	2,950	4,420	5,890	7,360	8,810	10,300	11,700
48	150.8	5,250	7,860	10,500	13,100	15,700	18,200	20,900
60	188.5	8,340	12,500	16,600	20,800	24,900	29,000	33,000
78	245.0	13,300	19,900	26,500	33,100	39,600	46,100	52,700
102	320.4	23,700	35,500	47,300	59,100	70,700	82,400	94,200
120	377.0	32,800	49,200	65,500	81,800	97,900	114,000	130,000
144	452.4	47,300	70,800	94,300	118,000	141,000	164,000	188,000
168	527.8	64,400	96,300	128,000	160,000	192,000	223,000	255,000



Methods of Preparing Butadiene

By GUSTAV EGLOFF and GEORGE HULLA
Universal Oil Products Co., Chicago, Ill.

PART 6

This series of articles presents a complete summary of the sources of butadiene as revealed by the technical literature and by the research staff of Universal Oil Products Co. It contains a total of 38 tables of data. A list of the subjects covered was published on Page 41 of the November 5 issue of the Journal.

Table 19 is on the ethenylation of ethene by condensation with itself, through loss of hydrogen, by catalysis and metathesis. Ethene unites directly with ethyne at a dull red heat under noncatalytic conditions or at 300°-450° C. in the presence of suitable catalysts. The yield is stated to be 20 per cent by weight on the charge per pass, increasing 4.25 fold upon recycling, in the presence of catalysts and 5 atm. pressure. In recent work much lower yields were obtained at 610° C. and atmospheric pressure in the presence of steam and some carbon monoxide, probably due to working with a deficiency of ethyne. Details on the use of ethanediol-1,2 in the ethenylation of ethene cannot be given due to a general unavailability of Russian patents.

TABLE 19—ETHENYLATION OF ETHENE

Reactants and diluents	Catalysts and apparatus used	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Ethene *per se* $2\,C_2H_4 \rightarrow C_4H_6 + H_2$	Cu was the catalyst.	Dull or moderate red heat		B yield = ?	W. H. Perkin and F. E. Matthews, British Patent 17,235 of July 24, 1913.
Ethene and O_2, S, Fe_2O_3, $FeCl_3$, or other substances removing hydrogen $2\,C_2H_4 \rightarrow C_4H_6 + H_2$		712 (Fe_2O_3) 714 ($FeCl_3$)	1 (all cases)	B yields = ? The H_2 is removed as H_2O, HCl, or H_2S by chemical reaction.	W. H. Perkin and F. E. Matthews, British Patent 15,049 of June 25, 1914.
Ethene and ethyne $C_2H_4 + C_2H_2 \rightarrow C_4H_6$	Glass bell jar.	Dull red heat		B yield = ?	M. P. E. Berthelot, Ann. chim. phys. (4) 9, 445-469 (1866); (5) 10, 169-187 (1877); Compt. rend. 82, 927-932 (1876).
Ethene and ethyne $C_2H_4 + C_2H_2 \rightarrow C_4H_6$	Porcelain tube (empty) or Bohemian glass tube filled with pumice.	Dull red heat (porcelain tube)		B yield = ?	L. Prunier, Ann. chim. phys. (5) 17, 5-62 (1879).
Ethene and ethyne $C_2H_4 + C_2H_2 \rightarrow C_4H_6$	Silicic acid and titanic acid were catalysts.	300-450	1 or less	B yields = ?	Chemische Fabrik in Buchau-Magdeburg, German Patent Application C. 21963 of July 17, 1913; Friedlaender's Fortschritte der Teerfarbenfabrikation 11, 829 (1915).
Ethene and ethyne $C_2H_4 + C_2H_2 \rightarrow C_4H_6$	Steel tube. Can use molybdic acid or the hydroxides, oxides, or oxychlorides of the alkalies or alkaline earths as catalysts.	350-450	5	B yield was 20% by weight on feed per pass and 85% by weight on feed with recycling.	H. Otto Traun's Forschungslaboratorium G.m.b.H., British Patent 156,116 of March 30, 1922.
Ethene, ethyne, steam, and carbon monoxide $C_2H_4 + C_2H_2 \rightarrow C_4H_6$	Pyrex tubing (spiral).	610	1	B yields were 3.85-5.93% by weight of the theoretical. An excess of ethene was used in all cases.	E. A. Narogon, R. E. Burk, and H. P. Lankelma, Ind. Eng. Chem. 34, 355-358 (1942).
Ethene and ethanediol-1,2 (i.e., ethene glycol) $C_2H_4 + C_2H_4(OH)_2 \rightarrow C_4H_6 + 2\,H_2O$				See patent for details.	B. V. Buizov, Russian Patent of Sept. 15, 1924; Chem. Abs. 22, 4132 (1928).

Table 20 has data on the dehydration, dehydrogenation plus condensation of ethanol. It will be observed that the experimental data go back to the year 1901 when Professor Nef of the University of Chicago reported on the condensive action of a zinc and pumice catalyst, in Liebig's Annalen der Chemie. Two years later, Professor Ipatieff of the Artillery Academy, St. Petersburg, produced butadiene using alumina and slightly higher yields with powdered aluminum as catalysts. At Professor Ipatieff's suggestion, the condensive action was further studied by Filippov, Gdanovitch, and other Russian chemists. Professor Lebedev, in particular, by 1930 succeeded in raising the yield to 18 per cent by weight and by 1934 to about 25 per cent by weight on ethanol. Lebedev's catalyst was a mixture of alumina and zinc oxide. The first large plant built in Russia to utilize this process was started July 7, 1932, followed by a second plant on September 14, 1932, after 6 years of intense work.

A summary of the rest of the Table 20 data on production of butadiene from ethanol can be given as follows: The reaction tubes are preferably fabricated of pure copper, enameled iron, or aluminum-coated iron. Plain iron tubes are about 60 per cent efficient, compared to copper tubes. A temperature of 450° C., pressure of 1 atm., and the use of a catalyst comprising 25 per cent of dehydrating component (e.g., alumina or clay) and 75 per cent of dehydrogenating component (e.g., zinc oxide) are recommended. The starting material may be either absolute or dilute alcohol. The diluents may be other alcohols, or water up to 54 per cent by volume. The theoretical yield of butadiene, 58.7 per cent by weight, cannot be obtained; at least 33.7 per cent (i.e., 58.7-25) by weight of the alcohol is diverted toward the formation of organic byproducts, including ethene, butene-2, acetaldehyde, diethyl ether, butanol, and hexanol, which must be disposed of in competition with well-established processes for these substances.

The president's special rubber committee (Messrs. Baruch, Conant and Compton) found no criticism of the existing per annum allotment of 220,000 tons of butadiene from ethanol, equivalent to 242,000 tons of buna-S rubber, cf. The Oil and Gas Journal 41, No. 19, pp. 24-25 (1942). According to Albert L. Elder of the War Production Board, cf. National Petroleum News, 34, No. 37, p. 11 (1942), this will require 80,000,000 bu. of corn annually. Two and one-half gallons of absolute ethanol are obtainable from 1 bu. of shelled corn, according to established practice. Therefore, the 80,000,000 bu. estimate must be based upon 33 per cent yields of butadiene from ethanol. If one accepts the 25 per cent yield indicated in Table 20, about 107,200,000 bu. of corn will be required per annum:

242,000 tons of buna-S ÷ 1.1 = 220,000 tons of "butadiene rubber"
220,000 tons of "butadiene rubber" × 2,000 lb. per ton = 440,000,000 lb. of butadiene
440,000,000 lb. of butadiene ÷ 1.644 lb. of butadiene per gallon of ethanol = 268,000,000 gal. of ethanol
268,000,000 gal. of ethanol ÷ 2.5 gal. per bushel = 107,200,000 bu. of corn.

Finally, it may be remarked that ethanol can be and has been produced at a cost of about 10 cents per gallon from petroleum cracked gases, or at 47.3 cents per gallon from corn valued at 66.8 cents per bushel (average cost for 1920-33, compare Statistical Abstract of U. S., 1934, p. 600).

Table 21 has data on the condensation of ethanol with close derivatives, including ethanal (i.e., acetaldehyde), paraldehyde (i.e., acetaldehyde trimer), 1,1-dibromoethane, 1,2-dibromoethane, bromoethene (i.e., vinyl bromide), ethyne, and ethanediol (i.e., ethene glycol). Each reaction is a condensation with elimination of water from the molecules, besides dehydrodebromination in the four cases wherein halogen derivatives are utilized. Yields are available only in the case of the reaction of ethanol with ethanal. Istituto per la Studio Della Gomma Sintetica indicates approximately 20 per cent by weight of butadiene-1,3 on total ethanol plus ethanal feed. Russian workers report a maximum yield of 14 per cent.

(Continued on Next Page)

TABLE 20—DEHYDRATION, DEHYDROGENATION, AND CONDENSATION OF ETHANOL (I.E., ETHYL ALCOHOL)

Composition of feed—	Apparatus and catalyst used	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Zn + pumice was the catalyst.	290-335 340-360	1 1	B yields were 0.12 and 0.1% by weight on feed at 290°-335° and 340°-360° C., respectively. The reactions were incomplete from the decomposition standpoint.	J. U. Nef, Ann. 318, 137-230 (1901) (especially p. 201).
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Al_2O_3 was the catalyst.	380		B yield was 0.014% by weight on feed.	V. N. Ipatieff, Ber. 36, 1,990-2,003 (1903).
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Glass tube charged with powdered aluminum.	580-600 660-680		B yields were 0.85% by weight on feed.	V. N. Ipatieff, J. prakt. chem. (2) 67, 420-422 (1903); V. N. Ipatieff, "Catalytic Reactions at High Pressures and Temperatures," The Macmillan Co. (1936), p. 119.
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Al_2O_3+ZnO was the catalyst.			See patent for details. B yield was "good."	S. V. Lebedev, French Patent 665,-917 of Sept. 25, 1929; Chem. Zentr. 1930, 1, 3,484.
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Al_2O_3+ZnO was the catalyst.	400	0.25	B yield was 18% by weight on feed.	S. V. Lebedev, British Patent 331,-482 of June 30, 1930.
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	The catalyst had two components (dehydrating and dehydrogenating).			See original article for details.	S. V. Lebedev, Sotzialist. Rekonstruktziya i Nauka 3, No. 1, 127-136 (1933); Chem. Abs. 29, 2,390-2,391 (1935).
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$				See patent for details.	S. V. Lebedev, Russian Patent 24,-393 of Sept. 24, 1931; Chem. Abs. 28, 3,050 (1934).
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	The catalyst had two components (dehydrating and dehydrogenating).	Elevated	1 or less	See patent for details.	S. V. Lebedev, Russian Patent 35,-182 of March 31, 1934; Chem. Abs. 29, 8,010 (1935).
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Al_2O_3+ZnO probably was the catalyst. Pressure vessels used.	Elevated		See patent for details.	S. V. Lebedev, Polish Patent 16,966 of Feb. 12, 1929; Chem. Zentr. 1933, 2, 3,916.
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Quartz tube containing ZnO+aluminum hydrosilicate ($Al_2O_3 \cdot SiO_2 \cdot xH_2O$) as catalyst.	410	1 or less	B yield was 15% by weight on fully decomposed ethanol. Feed was 95% ethanol.	S. V. Lebedev, German Patent 577,-630 of June 3, 1933.
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Catalyst of undisclosed composition was used.			B yield was 20-25% by weight on product.	S. V. Lebedev, J. Gen. Chem. (U.S.S.R.) 3, 698-717 (1933); Chem. Abs. 28, 3,050 (1934); "S. V. Lebedev, Life and Works," edited by A. E. Favorskii, A. P. Ostroumova-Lebedeva, V. Ya. Kurbatov, and A. O. Yukubchik, publ. by O.N.T.I. Khimteoret, Leningrad (1938), pp. 491-514; Translation S-183 in May 15, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature.
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Quartz tube, 10 mm. diameter, or Cu tube, 28-30 mm. diameter, or Cu tube, 10 cm. diameter and 1 meter long, or enameled Fe tube, 10 cm. diameter and 1 meter long, or Cu? tube, 12 cm. diameter and 3.5 meter long, or 6 tubes in parallel (Cu? or enameled Fe?) each 10 cm. diameter and 1 meter long. In each case a catalyst was used but its composition was not disclosed.	440-450 (28-30 mm. Cu tube) 450 (3.5 meter tube)	0.934 (28-30 mm. Cu tube) 0.934-0.961 (6 parallel tubes)	B yield from the "6 tubes in parallel" was about 0.5 gram per liter of exit gas. Article has much data on furnace construction and on mechanical recovery of B.	S. V. Lebedev, I. A. Volzhinskii, S. G. Kibirkshtis, G. G. Koblyanskii, V. P. Krause, M. A. Krupyshev, and Ya. M. Slobodin, Trudy Gosudarst. Opytnogo Zavoda Sinteticheskogo Kauchuka Litera B, 3, 7-16 (1934); "S. V. Lebedev, Life and Works," edited by A. E. Favorskii, A. P. Ostroumova-Lebedeva, V. Ya. Kurbatov, and A. O. Yakubchik, publ. by O.N.T.I. Khimteoret, Leningrad (1938), pp. 515-525; Translation S-192 in July 3, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature.
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Tubes of Cu, Fe, enameled Fe, Al-coated Fe, or of quartz. Each tube contained two component catalyst (clay was one component?).	435 (Enameled Fe tube) 434-445 (Cu or Fe tube) 415-425 (Al-coated Fe tube) 440 (quartz tube)	1 (Fe, enameled Fe, or Al-coated Fe tubes) 0.974 (Cu tube) 0.0395-0.526 (quartz tube)	B yield from Cu tube was 20-23% by weight on fully decomposed ethanol; the enameled Fe tube gave a similar yield. B yield from Al-coated Fe tube was 20-22.4% by weight on fully decomposed ethanol. B yield from plain Fe tube was 15% by weight on fully decomposed ethanol. B yield from quartz tube was 19.4% by weight on fully decomposed ethanol at 0.171 atmosphere pressure. Also has data on and considers the significance of feed velocity coefficients, ethanol concentration, preheating of ethanol to reaction temperature, and absolute pressure.	S. V. Lebedev, I. A. Volzhinskii, Yu. A. Gorin, A. I. Gulyaeva, G. M. Kogan, S. G. Kibirkshtis, G. G. Koblyanskii, V. P. Krause, M. A. Krupishev, I. A. Livshitz, S. M. Orlov, Ya. M. Slobodin, S. A. Subbotin, M. A. Khokhlovkin, A. N. Reshetov, and A. M. Tatarnikov, Trudy Gosudarst. Opytnogo Zavoda Sinteticheskogo Kauchuka Litera B, 3, 16-40 (1934); "S. V. Lebedev, Life and Works," edited by A. E. Favorskii, A. P. Ostroumova-Lebedeva, V. Ya. Kurbatov, and A. O. Yakubchik, publ. by O.N.T.I. Khimteoret, Leningrad (1938), pp. 526-553; Translation S-191 in June 26, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature.
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Empty Fe tube (Case A), Fe tube containing glass (Case B), and Cu tube packed with Al wire (Case C).	600	1 (?)	B yields were 0.06, 0.11, and 0.25% by weight on feed in the Cases A, B, and C, respectively.	Ibid.
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$		About 425		No details of process available except on byproducts.	Ya M. Slobodin, J. Gen. Chem. (U.S.S.R.) 5, 1,415-1,420 (1935); Translation S-195 in July 10, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature.
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Small laboratory furnace. Catalyst was used but its composition was not disclosed.	450		With fresh catalyst, B yield was 17.9% by weight on feed per pass and 22.3% by weight on fully decomposed feed. With fatigued catalyst, due to carbonization, B yield was 11.2% by weight on feed per pass and 14.6% by weight on fully decomposed feed.	Yu. A. Gorin, O. M. Neimark, and F. N. Kogan, Sintet. Kauchuk 4, No. 5, 6-10 (1935); Translation S-199 in July 17, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature.
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Large-scale laboratory unit. Catalyst was used but its composition was not disclosed.	450		With fatigued catalyst, due to repeated regeneration, B yield was 6-7% by weight on feed per pass and 10-12% by weight on fully decomposed feed.	Ibid.

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TABLE 20—DEHYDRATION, DEHYDROGENATION, AND CONDENSATION OF ETHANOL (I.E., ETHYL ALCOHOL) (Continued)

Composition of feed—	Apparatus and catalyst used	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Cu tubes, 1 meter long and 10 cm. diameter, containing "well selected" catalyst.	450		B yield was over 20% by weight on fully decomposed feed. Byproducts include ethane, butene-2, acetaldehyde, diethyl ether, butanol, and hexanol.	S. V. Lebedev, Teknicheskaya Entsiklopediya (Technical Encyclopedia) 20, 815 ff. (1935); "S. V. Lebedev, Life and Works," edited by A. E. Favorskii, A. P. Ostroumova-Lebedeva, V. Ya. Kurbatov, and A. O. Yakubchik, publ. by O.N.T.I. Khimteoret, Leningrad (1938), pp. 443-461; Translation S-171 in April 3, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature.
Ethanol $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Catalyst composition was not disclosed (probably oxides).	450	0.974-0.987	B yield was 16% by weight on feed per pass and 24% by weight on fully decomposed feed.	S. V. Lebedev, Yu. A. Gorin, S. N. Khutoretskaya, K. N. Charskaya, and F. N. Kogan, Sintet. Kauchuk 4, No. 1, 8-27 (1935); "S. V. Lebedev, Life and Works," edited by A. E. Favorskii, A. P. Ostroumova-Lebedeva, V. Ya. Kurbatov, and A. O. Yakubchik, publ. by O.N.T.I. Khimteoret, Leningrad (1938), pp. 602-623; Translation S-185 in May 29, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature.
Ethanol and alkanol diluents $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Silica tube, 1 meter long, in Cases A, B and C. 6 tubes (Cu or enameled Fe) in parallel, each 1 meter long, in Case D. Diluents were methanol in Cases A and B, propanol-2 in Case C, and propanol-1 in Case D. In all cases, the catalyst composition was undisclosed, but the dehydrating and dehydrogenating components were 25% and 75%, respectively.	425 (Case A) 450 (Case B) 460 (Case C) 450-455 (Case D)	0.961-0.974 (All cases)	B yields were 1.74, 2.17, 15.2, and 25.15% by weight on absolute ethanol feed per pass in the Cases A, B, C and D, respectively.	V. P. Krause and Ya. M. Slobodin, J. Applied Chem. (U.S.S.R.) 9, 1,278-1,289 (1936); Translation S-188 in June 12, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature.
Ethanol and steam $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	Probably a 1 meter Cu tube. Catalyst had two components (clay was one component?).	435-445 (?)	1	B yield was 17.7% by weight on absolute ethanol feed per pass and 25.1% by weight on fully decomposed absolute ethanol feed.	S. V. Lebedev, I. A. Volzhinskii, Yu. A. Gorin, A. I. Gulyaeva, G. M. Kogan, S. G. Kibirkshtis, G. G. Koblyanskii, V. P. Krause, M. A. Krupuishev, I. A. Livshitz, S. M. Orlov, Ya. M. Slobodin, S. A. Subbotin, M. A. Khokhlovkin, A. N. Reshetov, and A. M. Tatarnikov, Trudy Gosudarst. Opytnogo Zavoda Sinteticheskogo Kauchuka Litera B, 3, 16-40 (1934); "S. V. Lebedev, Life and Works," edited by A. E. Favorskii, A. P. Ostroumova-Lebedeva, V. Ya. Kurbatov, and A. O. Yakubchik, publ. by O.N.T.I. Khimteoret, Leningrad (1938), pp. 526-553; Translation S-191 in June 26, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature.
Ethanol and steam $2\,C_2H_5OH \rightarrow C_4H_6 + 2\,H_2O + H_2$	"Laboratory furnace." Feed mixture was "54% by volume ethanol" in Cases A and B, "76% by volume ethanol" in Cases C and D, and "94.5% by volume ethanol" in Cases E and F. Catalyst had two components (clay was one component?).	440 (Cases A, C, E) 500 (Cases B, D, F)	1 (All cases)	B yields were 15.0, 18.8, 15.3-16.5, 18.0-19.3, 24.0, and 17.7% by weight on fully decomposed absolute ethanol feed in the Cases A, B, C, D, E, and F, respectively.	Ibid.

TABLE 21—CONDENSATION OF ETHANOL WITH CLOSE DERIVATIVES

Composition of feed	Apparatus and catalyst used	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Ethanol and ethanal $C_2H_5OH+CH_3CHO \rightarrow C_4H_6+2H_2O$	Al_2O_3 was the catalyst	440-460	0.895-0.934	B yield was 14% by weight on total feed. Steam used = ? Has data for 97 experiments.	I. I. Ostromyslenskii and S. S. Kelbasinskii, J. Russ. Phys. Chem. Soc. 47, 1509-1529 (1915); Translation S-166 in March 20, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature
Ethanol and ethanal $C_2H_5OH+CH_3CHO \rightarrow C_4H_6+2H_2O$	Al_2O_3 was the catalyst	360-450		B yield = ?	I. I. Ostromyslenskii, J. Russ. Phys.-Chem. Soc. 47, 1472-1494 (1915); Translation S-152 in Feb. 6, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature
Ethanol and ethanal $C_2H_5OH+CH_3CHO \rightarrow C_4H_6+2H_2O$	Catalysts were red phosphorus; glacial H_3PO_4; sulfanilic acid; $BaCl_2$; or Al_2O_3 ("argilla pura")	360-450		B yield = ?	I. I. Ostromyslenskii, J. Russ. Phys.-Chem. Soc. 47, 1494-1506 (1915); Translation S-159 in Feb. 20, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature
Ethanol and ethanal $C_2H_5OH+CH_3CHO \rightarrow C_4H_6+2H_2O$	Catalyst was used but its composition was not disclosed	450	0.974-0.987	B yield was 9.5% by weight on total feed and 11% by weight on fully decomposed feed. Feed used was ethanol and ethanal in equal amounts by weight	S. V. Lebedev, Yu. A. Gorin, S. N. Khutoretskaya, K. N. Charskaya, and F. N. Kogan, Sintet, Kauchuk 4, No. 1, 8-27 (1935); "S. V. Lebedev, Life and Works," publ. by O.N.T.I. Khimteoret (1938), pp. 602-623; Translation S-185 in May 29, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature
Ethanol and ethanal $C_2H_5OH+CH_3CHO \rightarrow C_4H_6+2H_2O$	Special unit of the plant "Krasnyi Bogatyr" in Moscow during 1919-22			B yields were 6% by weight on feed.	S. V. Lebedev, Tekhnicheskaya Entsiklopediya (Technical Encyclopedia) 20, 815 ff. (1935); "S. V. Lebedev, Life and Works," publ. by O.N.T.I. Khimteoret, Leningrad (1938), pp. 443-461; Translation S-171 in April 3, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature

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TABLE 21—CONDENSATION OF ETHANOL WITH CLOSE DERIVATIVES (Continued)

Composition of feed—	Apparatus and catalysts used	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Ethanol and ethanal $C_2H_5OH+CH_3.CHO \rightarrow C_4H_6+2H_2O$	Catalyst was $Al.(SO_4)_3$ $12H_2O$. Feed mixture was ethanol 54, ethanal 33.5, and water 12.5 parts by weight	320-360	1	B yield was 19.8% by weight on ethanol + ethanal feed	Istito per lo Studio Della Gomma Sintetica, A. Maximoff, and O. Canonici, British Patent 535,678 of April 17, 1941
Ethanol and ethanal $C_2H_5OH+CH_3.CHO \rightarrow C_4H_6+2H_2O$	Catalyst was $Al_2(SO_4)_3$ on pumice. Feed mixture was ethanol 47, ethanal 23, and water 30 parts by weight	320-360?	1?	B yield = ?	Ibid.
Ethanol and ethanal $C_2H_5OH+CH_3.CHO \rightarrow C_4H_6+2H_2O$	Catalyst was basic aluminum sulfate	?	1?	B yield = ?	Ibid.
Ethanol, ethanal, and paraldehyde $\{ C_2H_5OH+CH_3.CHO \rightarrow C_4H_6+2H_2O$ $\{ 3C_2H_5OH+(C_2H_4O)_3 \rightarrow 3C_4H_6+6H_2O$	Al_2O_3 was the catalyst	440-460		B yield = ?	I. I. Ostromyslenskii, Agr. Gaz. Petrograd, 25, 701-706 (1915?); 26. 727-728 (1915?); Chem. Abs. 10, 3000 (1916)
Ethanol and paraldehyde $3C_2H_5OH+(C_2H_4O)_3 \rightarrow 3C_4H_6+6H_2O$				B yield = ?	I. I. Ostromyslenskii, J. Russ. Phys.-Chem. Soc. 47, 1494-1506 (1915); Translation S-157 in Feb. 20, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature
Ethanol and 1,1-dibromoethane $C_2H_5OH+Br_2HC.CH_3 \rightarrow C_4H_6+H_2O+2HBr$	Catalyst was used but its composition was not disclosed			B yield = ?	I. I. Ostromyslenskii, J. Russ. Phys.-Chem. Soc. 47, 1472-1494 (1915); Translation S-152 in Universal Oil Products Co. Survey of Foreign Petroleum Literature
Ethanol and 1,2-dibromoethane $C_2H_5OH+BrH_2C.CH_2Br \rightarrow C_4H_6+H_2O+2HBr$	Catalyst was $Al_2O_3+BaCl_2$	400		B yield = ?	I. I. Ostromyslenskii, J. Russ. Phys.-Chem. Soc. 47, 1494-1506 (1915); Translation S-157 in Feb. 20, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature
Ethanol and 1,2-dibromoethane $C_2H_5OH+BrH_2C.CH_2Br \rightarrow C_4H_6+H_2O+2HBr$	Catalyst was used but its composition was not disclosed			B yield was "poor"	I. I. Ostromyslenskii, J. Russ. Phys.-Chem. Soc. 47, 1472-1494 (1915); Translation S-152 in Feb. 6, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature
Ethanol and bromoethane (i.e., vinyl bromide) $C_2H_5OH+BrHC=CH_2 \rightarrow C_4H_6+H_2O+HBr$	Catalyst was $Al_2O_3+BaCl_2$	400		B yield = ?	I. I. Ostromyslenskii, J. Russ. Phys.-Chem. Soc. 47, 1494-1506 (1915); Translation S-157 in Feb. 20, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature
Ethanol and ethyne $C_2H_5OH+HC \equiv CH \rightarrow C_4H_6+H_2O$	Catalyst was used but its composition was not disclosed	Above 350		B yield = ?	I. G. Farbenindustrie A.-G., German Patent Application I. 36212 (Kl. 12o. Gr. 19); Friedlaender's Fortschritte der Teerfarbenfabrikation 17, 140 (1932)
Ethanol and ethanediol-1,2 (i.e., ethene glycol) $C_2H_5OH+HO.H_2C.CH_2OH \rightarrow C_4H_6+3H_2O$				See patent for details	B. V. Bulzov, Russian Patent 1101, Sept. 15, 1924; Chem. Abs. 22, 4132 (1928)

Table 22 considers various treatments of alkanols above ethanol in molecular weight. The yields of butadiene-1,3 from propanol were low, as expected from the odd number of carbon atoms per molecule of the latter. The maximum butadiene yields from butanol-1 and butanol-2, respectively 11 and 14.6 per cent by weight, are low in comparison with the theoretical value. These reactions seem to be established as dehydrations plus dehydrogenations. Apparently, the proper catalysts and reaction conditions have not been established or reported. A priori there seems to be no reason why the butadiene yields from the butanols cannot be raised to the theoretical maximum of 73 per cent by weight.

TABLE 22—TREATMENT OF HIGHER ALKANOLS (C_2H_5OH AND ABOVE)

Process and alkanol used	Apparatus and catalysts used	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Catalysis of propanol-2 (i.e., isopropyl alcohol) probably $3H_3C.CH(OH).CH_3 \rightarrow C_4H_6+H_3C.CO.CH_3+2CH_4+2H_2O$	Pumice was the catalyst	615-620	1	B yield was 0.054% by weight on feed	J. U. Nef, Ann. 318, 137-230 (1901)
Catalysis of propanol-2 (i.e., isopropyl alcohol) probably $3H_3C.CH(OH).CH_3 \rightarrow C_4H_6+H_3C.CO.CH_3+2CH_4+2H_2O$	Hard glass tube	840-850	1?	B yield = ? (low in value)	V. N. Ipatieff, Ber. 35, 1047-1057 (1902); J. Russ. Phys.-Chem. Soc. 34, 182-195 (1902)
Dehydration and dehydrogenation of butanol-1 $C_4H_9OH \rightarrow C_4H_6+H_2O+H_2$	Mixture of aluminum silicate and reduced Cu was the catalyst	Red heat	Vacuo unless diluents are used	B yield = ?	W. H. Perkin and F. E. Matthews, British Patent 17,235 of July 24, 1913
Dehydration and dehydrogenation of butanol-1 $C_4H_9OH \rightarrow C_4H_6+H_2O+H_2$	Quartz tube	Red heat	1	B yield was 11% by weight on feed. If desired, use Al_2O_3 or kieselguhr as the catalyst	Farbenfabriken vorm. Friedrich Bayer & Co., German Patent 264,264 of April 28, 1913; Friedlaender's Fortschritte der Teerfarbenfabrikation 11, 797-798 (1915)
Dehydration and dehydrogenation of butanol-1 $C_4H_9OH \rightarrow C_4H_6+H_2O+H_2$		750	1	B yield was 0.41% by weight on feed	H. Staudinger, R. Endle, and J. Herold, Ber. 46, 2466-2477 (1913)
Dehydration and dehydrogenation of butanol-1 $C_4H_9OH \rightarrow C_4H_6+H_2O+H_2$				B yield was 1.2-4.8% by weight on gaseous hydrocarbons produced	R. Obolentsev, B. Pazhitnov, R. Rutkovskii, and A. Trifel, Neftyanaya Promyshlennost S.S.S.R. (Petrol. Ind. U.S.S.R.) 1941, No. 1, pp. 93-99; Khim. Refer. Zhur. 4, No. 9, 119 (1941); abstract translated in July 10, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature
Dehydration and dehydrogenation of butanol-2 $C_4H_9OH \rightarrow C_4H_6+H_2O+H_2$	Quartz tube	Red heat	1	B yield was 14.6% by weight on feed. If desired, use Al_2O_3 or kieselguhr as the catalyst	Farbenfabriken vorm. Friederich Bayer & Co., German Patent 264,264 of April 28, 1913; Friedlaender's Fortschritte der Teerfarbenfabrikation 11, 797-798 (1915)
Dehydration and dehydrogenation of butanol-2 $C_4H_9OH \rightarrow C_4H_6+H_2O+H_2$	Quartz tube containing 5% of a dehydrating catalyst and 95% of a dehydrogenating catalyst	440	0.961-0.974	B yield was 0.9% by weight on feed per pass and 1.06% by weight on fully decomposed feed. Components of the catalyst were not disclosed	V. P. Krause and Ya. M. Slobodin J. Applied Chem. (U.S.S.R.) 9, 1278-1289 (1936); Trans. S-188 in June 12, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature

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TABLE 22—TREATMENT OF HIGHER ALKANOLS ($C_5H_{11}OH$ AND ABOVE) (Continued)

Process and alkanol used—	Apparatus and catalysts used	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Partial oxidation (by air) of "butanol" vaporized by illuminating gas $C_4H_9.OH+\frac{1}{2}O_2 \rightarrow C_4H_6+2H_2O$			1	B yield = ?	Farbenfabriken vorm. Friedr. Bayer & Co., German Patent 278,647 of June 11, 1914; Friedlaender's Fortschritte der Teerfarbenfabrikation 12, 564-565 (1917)
Partial oxidation (by air) of "pentanol" vaporized by illuminating gas $C_5H_{11}.OH+O_2 \rightarrow C_4H_6+CO_2+H_2O$	Burner tube was heated to prevent condensation of pentanol vapors	?	1	B yield = ?	Ibid.
Dehydration and demethanation of 3-methylbutanol-1 $HO.H_2C.CH_2.CH(CH_3).CH_2 \rightarrow C_4H_6+H_2O+CH_4$	Porcelain tube	Red heat	1	B yield = ?	E. Caventou, Compt. rend. 56, 646-648 (1863); Ann. 127, 93-97 (1863)
Dehydration and demethanation of 3-methylbutanol-1 $HO.H_2C.CH_2.CH(CH_3).CH_2 \rightarrow C_4H_6+H_2O+CH_4$	Iron tube	Medium red heat	1	B yield = ?	J. Thiele, Ann. 308, 333-343 (1899)
Dehydration and demethanation of 3-methylbutanol-1 $HO.H_2C.CH_2.CH(CH_3).CH_2 \rightarrow C_4H_6+H_2O+CH_4$	Catalyst was pumice	580-620	1	B yield was 0.18% by weight on feed	J. U. Nef, Ann. 318, 137-230 (1901) (especially page 215)
Dehydration and demethanation of 3-methylbutanol-1 $HO.H_2C.CH_2.CH(CH_3).CH_2 \rightarrow C_4H_6+H_2O+CH_4$	Iron tube	660-680?	1?	B yield = ?	V. N. Ipatieff, Ber. 35, 1047-1057 (1902); J. Russ. Phys.-Chem. Soc. 34, 182-195 (1902)
Dehydration and demethanation of 3-methylbutanol-1 $HO.H_2C.CH_2.CH(CH_3).CH_2 \rightarrow C_4H_6+H_2O+CH_4$		750	1	B yield was 0.725% by weight on feed	H. Staudinger, R. Endle, and J. Herold, Ber. 46, 2466-2467 (1913)
Dehydration and demethanation of 3-methylbutanol-1 $HO.H_2C.CH_2.CH(CH_3).CH_2 \rightarrow C_4H_6+H_2O+CH_4$		500-600			I. I. Ostromyslenskii, J. Russ. Phys.-Chem. Soc. 47, 1947-1978 (1915); Chem. Abs. 10, 1340-1341 (1916)
Dehydration and demethanation of 2-methylbutanol-2 $H_3C.C(CH_3)(OH).CH_2.CH_2 \rightarrow C_4H_6+H_2O+CH_4$	Pumice was the catalyst	600-620	1	B yield was 0.071% by weight on feed	J. U. Neff, Ann. 318, 137-230 (1901) (especially page 218)
Dehydration and dehydrodechlorination of 3-chlorobutanol-1 $HO.H_2C.CH_2.CHCl.CH_3 \rightarrow C_4H_6+H_2O+HCl$	Al_2O_3, $BaCl_2$, or TlO_2 was the catalyst	High	1 or vacuo		I. G. Farbenindustrie A.-G. (F. Runge and M. Mueller-Cunradi, inventors), German Patent 578,038 of June 12, 1933; Chem. Zentr. 1933, II, 935.
Dehydration and dehydrodechlorination of 3-chlorobutanol-2 $H_3C.CH(OH).CHCl.CH_3 \rightarrow C_4H_6+H_2O+HCl$	Catalyst was (?) H_2PO_4 on pumice	Over 400	1 or vacuo	B yield = ?	F. E. Matthews and E. H. Strange, British Patent 12,771 of May 30, 1912

Table 23 pertains to the conversions of butanediols and butanetetrol-1,2,3,4 into butadiene-1,3. Much work has been carried out on the catalytic dehydration of butanediol-1,3, due mainly to its availability from acetaldehyde, through hydrogenation of aldol. Only a portion of the data is submitted regarding butanediol-1,3; this fact probably does not affect the general picture. The butadiene yields from butanediol-1,3 can attain a value of 48-49 per cent by weight of charge, corresponding to just over 80 per cent of the theoretical conversion.

The vapor-phase catalysis of butanediol-2,3 is of interest due to obtaining this alkanediol by fermentation of sugars and starches. No production data are available.

The reduction of butanetetrol-1,2,3,4, i.e., erythrite from various algae and lichens, into butadiene through the agency of formic acid and heat is an interesting reaction from the chemical standpoint. It can be considered as a bidehydration (removal of two OH and two H groups as $2H_2O$) plus a bidehydroxylation (conversion of two OH groups into two H groups by reduction, probably through the intervention of two formoxy groups). Theoretical yield is 44.3 per cent by weight; the only reported value is 6.67 per cent.

TABLE 23—CONVERSION OF BUTANEDIOLS AND BUTANETETROL

Process and starting derivatives—	Apparatus and catalyst used	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Dehydration of butanediol-1,3 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$	H_2PO_4 on pumice was the catalyst.	Heated	Vacuo if desired	B yield = ? Byproducts can be recycled.	F. E. Matthews, E. H. Strange, and H. J. W. Bliss, British Patent 3,873 of March 17, 1913.
Dehydration of butanediol-1,3 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$	Catalyst was ignited kaolin.	380-400	1	B yield was about 5.5% by weight on feed.	L. P. Kyriakides, J. Am. Chem. Soc. 36, 980-987 (1914).
Dehydration of butanediol-1,3 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$				B yield was 50-65% (probably on the theoretical, which is 60.0%).	I. I. Ostromyslenskii, J. Russ. Phys.-Chem. Soc. 47, 1,947-1,978 (1915); Chem. Abs. 10, 1,340-1,341 (1916).
Dehydration of butanediol-1,3 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$	Catalysts were Al_2O_3; red phosphorus; glacial H_3PO_4, or sulfanilic acid.	350-480		B yield = ?	I. I. Ostromyslenskii, Kauchuk i Ego Analogi (Rubber and Its Analogs), Moscow (1913), pp. 195-204; J. Russ. Phys.-Chem. 47, 1,472-1,494 (1915); Translation S-152 in Feb. 6, 1942, Universal Oil Products Co. Survey of Foreign Petroleum Literature; cf. I. I. Ostromyslenskii, J. Russ. Phys.-Chem. Soc. 47, 1,494-1,506 (1915); Translation S-157 in Feb. 20, 1942, S. of F.P.L.
Dehydration of butanediol-1,3 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$	Catalysts were Al_2O_3; caustic alkali; H_3PO_4; oxalic acid; or $KHSO_4$.	450-470 (Al_2O_3 or caustic alkali) 300-350 (H_3PO_4)		B yields were 36-45% by weight on feed.	H. Plauson and J. A. Vielle, British Patent 156,145 of Dec. 31, 1920.
Dehydration of butanediol-1,3 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$	Catalyst was 1% of red phosphorus on pumice.	300-330		B yield was 39-42% by weight on feed.	I. G. Farbenindustrie A.-G. (M. Muller-Cunradi and E. Ober, inventors), German Patent 522,148 of Nov. 14, 1929; Friedlaender's Fortschritte der Teerfarbenfabrikation 16, 2,979 (1931).
Dehydration of butanediol-1,3 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$	Catalyst was NaH_2PO_4 + red phosphorus.	300-330		B yield was 80% on the product.	Ibid.
Dehydration of butanediol-1,3 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$	Catalyst was NaH_2PO_4 + H_3PO_4 on graphite.	260	1 (?)	B yield	I. G. Farbenindustrie A.-G., British Patent 326,185 of Feb. 27, 1930.
Dehydration of butanediol-1,3 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$	Catalyst was $Ca(H_2PO_4)_2+H_3PO_4$ on lampblack + graphite.	260	1 (?)	B yield	Ibid.

(Continued on Next Page)

TABLE 23—CONVERSION OF BUTANEDIOLS AND BUTANETETROL (Continued)

Process and starting derivatives—	Apparatus and catalyst used	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Dehydration of butanediol-1,3 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$	Vaporizer for feed mixture of butanediol and water. Catalyst was potassium aluminum sulfate prior-dehydrated at 150°-180° C.	240-250	1 (?)	B yield was 48% by weight on absolute butanediol feed per pass.	I. G. Farbenindustrie A.-G. (R. Leopold and A. Michael, inventors), German Patent 507,995 of Sept. 23, 1930.
Dehydration of butanediol-1,3 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$	Vaporizer for feed mixture of butanediol and water. Catalyst was mixture of potassium aluminum sulfate and ammonium aluminum sulfate prior-mixed and prior-dehydrated at 180° C. in N_2 steam.	270-290	1 (?)	B yield was 48-49% by weight on absolute butanediol feed.	Ibid.
Dehydration of butanediol-1,3 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$	Catalyst was H_2SO_4 (1%) in H_2O. An autoclave was used.	200	Over 15	B yield was 48% by weight on feed.	H. Halbig, N. Platzer, and A. Treibs (assignors to Consortium fur Elektrochemische Industrie G.m.b.H.), U. S. Patent 2,224,652 of Jan. 28, 1941; Consortium fur Elektrochemische Industrie G.m.b.H., British Patent 524,849 of Aug. 15, 1940, and French Patent 850,070 of Dec. 7, 1939.
Dehydration of butanediol-1,3 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$	Quartz tube containing the following catalysts: Al_2O_3 from Al $(NO_3)_3$ + NH_4OH (Exps. 1-3). Al_2O_3 from $NaAlO_2$ + CO_2 (Exps. 4-6). SiO_2 gel (exps. 7-9). Kaolin (Nippon Yakkyokuho) (Exps. 10-11). Kaolin (Korea) (Exps. 12-14). Japanese Acid Clay (Itiogawa) (Exps. 15-17). Kaolin 50 + P_2O_5 50 parts (Exps. 18-23). Kaolin 50 + Al_2O_3 50 parts (Exps 24-26). Kaolin 49 + Al_2O_3 49 + KOH2 parts (Exps. 27-29). Kaolin 50 + Japanese acid clay 50 parts (Exp. 30-32). Kaolin 50 + $FeSO_4$ 50 parts (Exps. 33-35. Kaolin 94 + Fe_2O_3 6 parts (Exps. 36-38). Kaolin 80 + Fe_2O_3 20 parts (Exps. 39-41). Kaolin 94.7 + Fe_2O_3 5 + KOH 0.3 part (Exps. 42-44). Kaolin 94 + Fe_2O_3 5 + KOH 1 part (Exps. 45-47). Kaolin 92 + Fe_2O_3 5 + KOH 3 parts (Exps. 48-50). Kaolin 94 + $Ni(OH)_2$ 5 + KOH 1 part (Exps. 51-53). "Red Mud" (i.e., clay after removing Al_2O_3 by soda lime) (Exp. 54). $CaSO_4$ (Exps. 55-56). $AlPO_4$ (Exps. 55-58).	250 (Experiments 1, 4, 7, 12 15, 18, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51) 300 (Experiments 2, 5, 8, 10, 13, 16, 19, 25, 28, 31, 34, 37, 40, 43, 46, 49, 52, 57) 350 (Experiments 3, 6, 9, 11, 14, 17, 20, 26, 29, 32, 35, 38, 41, 44, 47, 50, 53, 54, 55, 58) 400 (Experiments 21, 56) 450 (Exp. 22) 500 (Exp. 23)	0.934 (All cases)	B yields were 4.8, 8.9, 10.6, 4.8, 19.4, 18.1, 8.5, 10.5, 13.3, 14.0, 20.5, 26.8, 27.0, 22.8, 12.0, 20.4, 21.2, 17.0, 26.2, 29.0, 33.8, 35.1, 37.0, 6.8, 15.9, 16.2, 5.9, 13.7, 14.2, 17.8, 24.6, 23.6, 30.6, 28.6, 23.6, 21.1, 23.9, 25.8, 11.0, 21.0, 18.6, 20.6, 30.4, 29.4, 31.7, 40.1, 31.4, 12.8, 20.1, 19.1, 17.6, 23.0, 24.3, 2.5, 24.0, 22.3, 6.8, and 16.5% by weight on feed for experiments 1-58, respectively.	N. Nagai, J. Soc. Chem. Ind. Japan 44, Suppl. binding 64b-66b (1941).
Dehydration of butanediol-1,3 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$	Catalyst was triethylphosphate.	300-350	1	B yield was 48.6% by weight on feed.	H. M. Guinot (assignor to Usines de Melle), U. S. Patent 2,237,866 of April 8, 1941.
Dehydration of butanediol-1,3 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$	Catalyst was $POCl_3$. Used pumice or charcoal for heat transfer purposes.	300-350	1	B yield was 45.9% by weight on feed.	Ibid.
Dehydration of butanediol-1,4 $HO{\cdot}H_2C{\cdot}CH_2{\cdot}CH_2{\cdot}CH_2OH \rightarrow C_4H_6+2H_2O$	Catalyst of acid character, such as NaH_2PO_4, $CaHPO_4$, $Ca(H_2PO_4)_2$, Cu_2O, W oxide, Mo oxide, silicic acid, phosphotungstic acid, phosphomolybdic acid, or boric acid.			See patent for details.	I. G. Farbenindustrie, French Patent 845,305 of Aug. 18, 1939; Chem. Abs. 35, 1,068 (1941).
Dehydration of butanediol-2,3 $H_3C{\cdot}CH(OH){\cdot}CH(OH){\cdot}CH_3 \rightarrow C_4H_6+2H_2O$	Vapor-phase catalytic process.	(?)	(?)	B yield = ?	W. J. Murphy, Chemical Industries 50, No. 2, Part 1, p. 172 (1942).
Reduction of butanetetrol-1,2,3,4 (i.e., erythrite) $HO{\cdot}H_2C{\cdot}CH(OH){\cdot}CH(OH){\cdot}CH_2OH + 2H{\cdot}CO_2H \rightarrow C_4H_6 + CO_2 + 4H_2O$		230		B yield = ?	A. Henninger, Ber. 6, 70-71 (1873).
Reduction of butanetetrol-1,2,3,4 (i.e., erythrite) $HO{\cdot}H_2C{\cdot}CH(OH){\cdot}CH(OH){\cdot}CH_2OH + 2H{\cdot}CO_2H \rightarrow C_4H_6 + CO_2 + 4H_2O$		Distillation	1	B yield = ?	G. Ciamician and P. Magnahi Ber. 19, 569-574 (1886).
Reduction of butanetetrol-1,2,3,4 (i.e., erythrite) $HO{\cdot}H_2C{\cdot}CH(OH){\cdot}CH(OH){\cdot}CH_2OH + 2H{\cdot}CO_2H \rightarrow C_4H_6 + CO_2 + 4H_2O$		Above 100	1	B yield was 6.67% by weight on butanetetrol.	C. Prevost, Ann. chim. (10) 10, 356-439 (1928).
Reduction of butanetetrol-1,2,3,4 (i.e., erythrite) $HO{\cdot}H_2C{\cdot}CH(OH){\cdot}CH(OH){\cdot}CH_2OH + 2H{\cdot}CO_2H \rightarrow C_4H_6 + CO_2 + 4H_2O$		130-150	1	B yield = ?	E. Urion, Ann. chim. (11) 1, 5-87 (1934).

Table 24 presents data on the conversion of alkenols and alkenediols. As expected, propen-1-ol-3 yields only a small amount of butadiene-1,3. The dehydrations of butenols over catalysts or special reactants (P_2O_5 or $POCl_3$, both reacting with the water produced) are of interest in conjunction with the double dehydrations of the butanediols. The latter derivatives may dehydrate in steps, passing through intermediary stages of the type considered in the present table. The butadiene yields in the cases of buten-1-ol-3 and buten-1-ol-4 are high, close to the theoretical value of 75.0 per cent by weight. Buten-2-ol-1 is reported to yield up to 37.5 per cent of butadiene by weight in the presence of "warm" anhydrous oxalic acid.

The dehydroxylation of butene-1-diol-3,4 over copper at 280° C. is an interesting reaction from the mechanism standpoint. It apparently requires the removal of two OH groups. Its complexity is evident from the changes in oxidation state of the copper atoms, whereby electrons are removed, and of the two carbon atoms involved, appropriating such electrons. The yield is low.

TABLE 24—CONVERSION OF ALKENOLS AND ALKENEDIOLS

Process and starting derivative	Apparatus, catalysts and special reactants	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Catalytic treatment of propen-1-ol-3 (i.e., allyl alcohol), probably $2H_2C{=}CH.CH_2.OH \rightarrow C_4H_6+2CO+3H_2$	Brass tube containing brass shavings	600	1?	B yield = ? (low in value)	V. N. Ipatieff, Ber. 35, 1047-1057 (1902); J. Russ. Phys.-Chem. Soc. 34, 182-195 (1902)
Dehydration of buten-1-ol-3 (i.e., methylvinylcarbinol) $H_2C{=}CH.CH(OH).CH_3 \rightarrow C_4H_6+H_2O$	Catalyst of undisclosed composition was used			B yield = ?	C. Prevost, Compt. rend. 186, 1209-1211 (1928)

(Continued on Next Page)

TABLE 24—CONVERSION OF ALKENOLS AND ALKENEDIOLS (Continued)

Process and starting derivative	Apparatus, catalysts and special reactants	Temp. (°C.)	Pressure (atm.)	Remarks (B is butadiene-1,3)	References
Dehydration of buten-1-ol-3 (i.e., methylvinylcarbinol) $H_2C{=}CH.CH(OH).CH_3 \rightarrow C_4H_6+H_2O$	Catalyst of undisclosed composition was used	360		B yield was about 45-55% on feed per pass and about 56-70% on fully decomposed feed	C. Prevost, Ann. chim. (10) 10, 356-439 (1928)
Dehydration of buten-1-ol-3 (i.e., methylvinylcarbinol) $H_2C{=}CH.CH(OH).CH_3 \rightarrow C_4H_6+H_2O$	Trichloracetic acid was the catalyst	140		B yield = ? Product also had two, isomeric, monoesters	C. Prevost, Ann. chim. (10) 10, 147-181 (1928)
Dehydration of buten-1-ol-3 (i.e., methylvinylcarbinol) $H_2C{=}CH.CH(OH).CH_3 \rightarrow C_4H_6+H_2O$	Phosphorus pentoxide was used as reactant			B yield was slightly above 15% on feed	Ibid.
Dehydration of buten-1-ol-3 and/or buten-2-ol-1, probably $H_2C{=}CH.CH(OH).CH_3 \rightarrow C_4H_6+H_2O$	Precipitated Al_2O_3 was the catalyst	265	1	B yield was 20% on feed. Al_2O_3 precipitated on sodium aluminate and placed among layers of pumice was used as a catalyst also, but B yield = ? in this case	Ibid.
Dehydration of buten-1-ol-4 (i.e., allylcarbinol) $H_2C{=}CH.CH_2.CH_2OH \rightarrow C_4H_6+H_2O$	Catalyst was prepared by dehydrating and fusing a mixture of ammonium alum 90% and potash alum 10%	270-290	1?	B yield was 63.7-67.5% by weight on feed, using 1 recycle. Acid phosphates or pyrophosphates also have a catalytic effect	I. G. Farbenindustrie A.-G., British Patent 345,270 of March 18, 1931
Dehydration of buten-2-ol-1 (i.e., crotyl alcohol) $HO.H_2C.HC{=}CH.CH_3 \rightarrow C_4H_6+H_2O$	Toluidine bisulfate, anhydrous oxalic acid, $KHSO_4$, H_3PO_4, Al_2O_3, and $AlCl_3$ were catalysts named	140-160 (1st catalyst) "Warmed" (2d catalyst)	1 1	B yield was 22.5-30% by weight on feed for 1st catalyst and 30-37.5% by weight on feed for 2d catalyst. B yields = ? for other catalysts	Farbenfabriken vorm. Friedrich Bayer & Co., German Patent 263,-016 of April 14, 1913; Friedlaender's Fortschritte der Teerfarbenfabrikation 11, 797 (1915)
Dehydration of buten-2-ol-1 (i.e., crotyl alcohol) $HO.H_2C.HC{=}CH.CH_3 \rightarrow C_4H_6+H_2O$	Catalyst was probably kaolin or $AlPO_4$	400-450	1?	B yield = ?	L. P. Kyriakides, J. Am. Chem. Soc. 36, 980-987 (1914)
Dehydration of buten-2-ol-1 (i.e., crotyl alcohol) $HO.H_2C.HC{=}CH.CH_3 \rightarrow C_4H_6+H_2O$	$POCl_3$ (?) was used as reactant	300-350?	1	B yield was (?) 32% by weight on feed	H. M. Guinot (assignor to Les Usines de Melle), U. S. Patent 2,237,-866 of April 8, 1941
Dehydroxylation of butene-1-diol-3,4 (i.e., erythrol) $H_2C{=}CH.CH(OH).CH_2OH+2Cu \rightarrow C_4H_6+H_2O+Cu_2O$	Cu was used as reactant	280	1	B yield was 0.193% by weight on butenediol feed	E. Urion, Ann. chim. (11) 1, 5-87 (1934); cf. E. Urion, Compt. rend. 196, 353-354 (1933)

Raising Oil and Water From Oil Wells By Combination Air-Lift Methods

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INVENTIONS for lifting oil and water from oil wells by air-lift were made soon after the earliest wells were completed in Pennsylvania in 1859. One of the earliest inventions covering the use of air-lift was that of Abel Brear, patented in 1865. Other noteworthy inventions of an early date include the patents of J. P. Frizell in 1880, and Dr. Julius G. Pohle in 1892; the central air-lift system of W. L. Saunders in 1898; the Titus "kick-off" arrangement in 1898; and the tapered-tubing invention of L. T. Edwards in 1917.

Owing to low flowing pressures which are found to exist in oil wells when they have declined to a small production, there has been a pronounced movement in recent years toward the use of intermittent air-gas lift devices for lifting oil, in which method compressed air or gas is injected intermittently into the wells by means of automatic time-cycle regulators installed at convenient points on the surface. One of the earliest inventions of this nature was that of E. A. Watts patented in 1916 for the use of a set of chambers installed one above the other in the eductor of a well, the operation of which was controlled by the rise and fall of the liquid in the chambers.

Of late years the tendency has been toward the use of valves inserted in the eductor, which allow gas to enter it intermittently. Some of these valves depend upon the differential pressure between the casing and the eductor, others are controlled by the raising and lowering of a weight-bar suspended from a wire line in the tubing and operated by a time-cycle intermitter on the surface (1, 2). Intermittent air-lift operations of various types are now employed in many of the oil fields of the United States and in many oil-producing countries of the world.

In the early days of oil development, the air-lift was employed for lifting oil from wells that had ceased to flow in Russia in 1890; along the Gulf Coast at Jennings, La., Spindletop, Tex., and later in 1910 in Kern River, California, and a long list of fields can be given in which the air-lift was used in later years for lifting oil, or mixtures of oil and water, including such fields as Goose Creek, Hull, Humble, Orange, Powell, Wortham, and Smackover. These earlier operations were conducted in an unscientific manner as viewed from the present knowledge of air-lift operations, and yet very large quantities of oil were produced from these early fields by this method.

Later Developments

Later developments in the use of air-lift or gas-lift at Santa Fe Springs, Long Beach, Huntington Beach and other California fields; and at Tonkawa, Seminole and Oklahoma City in Oklahoma, opened the eyes of oil operators to the possibilities of the use of this method when large production is desired. In the later mentioned fields the use of air and gas-lift was studied as had never before been the case. Orifice meters were installed on many wells so that careful measurements could be obtained. The quantities of air or gas required for lifting a barrel of oil or water under given flowing pressures and through different sizes of eductors were determined more carefully than had ever before been the case. Through the use of both input and output orifice meters, determinations of the quantity of gas coming from the reservoir with the oil was made as had not before been the case, and a knowledge of oil-well flowing characteristics was obtained to an extent that had before not been possible[3, 4]. At one time the production of oil using air and gas lift in the Seminole field alone amounted to 10 per cent of the total production of the United States.

Large-scale lifting operations under present conditions of restricted production from comparatively shallow fields have given way to small-scale operations from much greater depths due to restricted allowables, and to the lifting of oil and water from wells in which the flowing pressures have declined to low levels. This calls for modifications of methods that have heretofore been employed.

In the years 1935-38, a notable contribution to oil-lifting methods was made when combination air-lift methods were employed at Oklahoma City for lifting oil in large quantity from wells 6,500 ft. in depth, and in which wells the fluid levels had declined to the point where a well would produce only 500 bbl. of oil per day on straight gas lift, but when placed on the Reda centrifugal pump, air-lift combination method, they were able to produce up to 5,000 bbl. per day. The Kobe hydraulic pump also was used in wells of smaller productive capacity in combination with air-gas lift, and the production was increased by three or fourfold.

The first combination air-lift method of which the writer has any record[5] is that of a mine-station plunger pump which was driven by compressed air, and which gave considerable trouble by freezing at the exhaust ports of the pump.

(Continued on Page 53)

*This paper won an award in the Compressed-Air Industry contest sponsored by the Compressed Air Institute of New York.

Refinery IDEAS

. . . that save $ $ $

Saddle Holds Gasket Over Leak in Condenser

A quick, simple and effective repair of a small break in the head of a condenser column was made by the operator of a small Texas refinery by clamping a gasket over the leak with a metal saddle. The saddle was made from a small piece of plate metal shaped to the curve of the condenser head. It is clamped over the head with the gasket by two U-bolts, one on each side, fastened under the inlet and outlet wings.

Refinery Utility Pump Mounted On Skids to Facilitate Handling

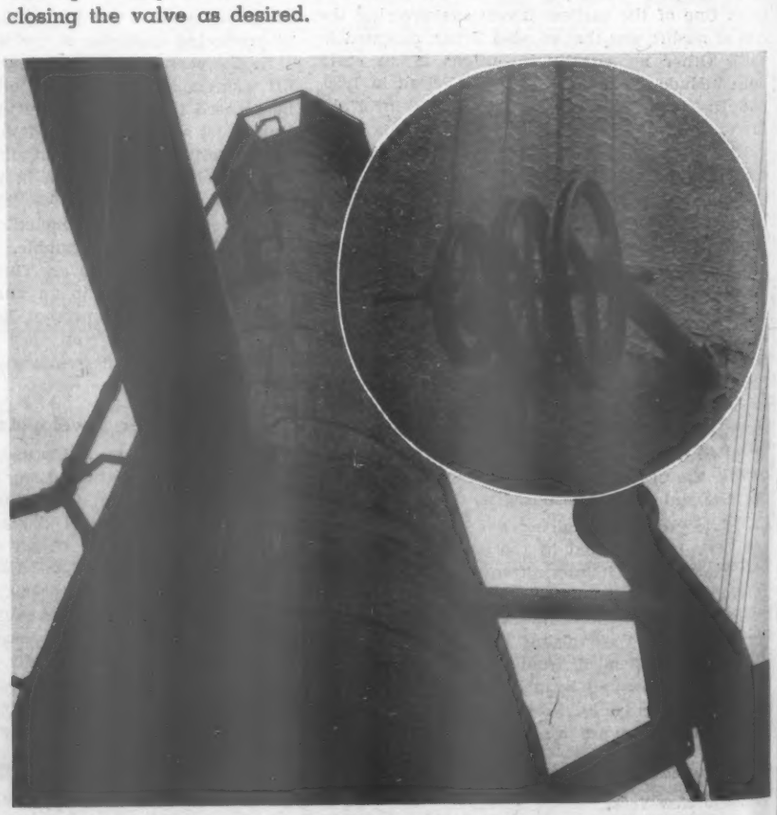
Every refinery has need for a steam pump that can be moved quickly to any part of the plant for general utility. To facilitate the handling of such a pump, one operator has mounted the pump on skids, similar to the way in which equipment is mounted in the drilling and producing ends of the industry. The skids were constructed of old refinery pipe.

Air Filter Constructed From Salvaged Pipe

With commercial equipment difficult to obtain, a refinery operator having need for a filter for the air to the air-operated instruments in a pump room built his own unit. It consisted of a short section of 10-in. pipe filled with steel wool and cotton waste as the filtering medium. Set up vertically, the lower end of the pipe was closed with a piece of plate metal welded on the bottom. The upper end was fitted with a flanged top to permit opening and cleaning. A 1-in. air inlet line is fitted into the bottom and the 1-in. outlet line at the top.

Remote Controls for Tower-Top Valves

Unable to obtain motor-driven valves ordinarily installed at the tops of fractionating towers and stills, an operator of a refinery in East Texas made use of hand-operated valves, operating them from the ground by means of a unique remote-control arrangement. For this, turning wheels of the valves were grooved, and for each valve another grooved wheel (insert) was mounted on the side of the column at a convenient height above the ground level. A heavy-gage wire was strung over each grooved valve wheel and its respective turning wheel at the base of the tower, so that by turning the latter wheel the valve wheel revolves, opening and closing the valve as desired.



Raising Oil and Water From Oil Wells

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It was not convenient to heat the air to prevent this freezing condition, and a trial was made of turning the exhaust into the water column, which was found to operate quite successfully, not only in eliminating the freezing condition of the exhaust, but also in utilizing the energy stored in the air that was discharged from the pump, and in reducing the discharge pressure in the pump column against which the pump was working.

Combination Air-Lift Plunger-Pump Method In Oil Fields

Trials were made of the air lift in combination with the plunger pump in the Seminole field in 1928-29,[7] and while it was demonstrated that a larger quantity of oil could be lifted than with the plunger pump alone which was operated by means of a beam, much trouble was experienced, and the practice was discontinued. Later in 1934-35, trials were made in the Oklahoma City oil field in which the Jackson plunger pump was used in combination with gas lift and in some instances met with a measure of success, but as a whole the trials were not satisfactory. In this method, the compressed air was employed to drive the pump engine, and this air was exhausted into the pump column and used to lift the oil by air lift from the pump to the surface. The use of compressed air to operate the pump was a distinct advantage in that it eliminated the need of a 6,500-ft. string of sucker rods, but the application of the compressed air to drive the pump and also to lift the oil to the surface met with difficulties in that there was no effective means of controlling the supply delivered to the pump as distinguished from the supply of air required to perform the air-lift operations. In fact, no attention was paid to the air-lift phase of the lifting operation, and yet this was most important since it involved lifting the oil from the pump to the surface, a distance of nearly 6,500 ft. Perhaps improvements could have been made in the type of pumping engine employed, but the main difficulty lay in the improper and misunderstood method of applying the air lift properly.

It is believed by the writer that this method of using the plunger pump driven by compressed air in combination with air lift possesses considerable merit, and should find an important application on oil-field lifting operations, particularly in deep wells. After flowing pressures in oil wells decline to a low point, the consumption of gas per barrel of oil increases to an excessive point; also the quantity of oil entering the well is reduced by reason of the back pressure held against the sand face through the use of this excessive quantity of gas. Therefore, if an increased submergence can be artificially created for the air lift and at the same time the back pressure at the sand face is reduced, there will be an increased production of oil, and a smaller quantity of compressed air required to lift the oil.

It would be necessary to control the supply of compressed air at the proper speed to drive the pump; it would also require that the proper quantity of compressed air be employed to perform the air-lift phase of the operation, and it would be only accidental if this happened to be the amount that would be discharged from the exhaust of the pump.

One means of controlling the supply of compressed air for the different uses would be to run two sets of tubing, thus providing three openings: one for the supply of air to the plunger-pump engine, another to supply the quantity of air required in the eductor column, and the third to act as the eductor column. The air supply to drive the pump could be admitted through the smaller tubing; the additional air for the air lift could be pumped through the annular space between the two tubing strings; and the remaining space between the outer tubing and the casing would then be employed as the eductor. It would be necesary to set a packer between the outer tubing and the casing at a suitable distance above the pump in order that the fluids would not return to the bottom of the well. By this means, control would be maintained of each operation; the engine of the pump would be driven at the speed that would lift the oil through the pump at the optimum rate; the air would be supplied to the bottom of the eductor in the quantity required to make up the deficiency in the exhaust from the pumping engine.

As soon as natural flow ceases in many oil wells, it is found convenient to employ air or gas lift for lifting the oil, since this method requires lower outlay for installation, and lower operating expense for lifting the oil than with most other methods. If gas under required pressure is not available from gas wells at a low cost for carrying on the lifting operation in the oil wells, compressors are installed for this work. It has been demonstrated that in oil-field operations where gas from the oil wells is available for fuel, that the cost of compressing air can be held to 1 or 2 cents per thousand cubic feet, and this provides an inexpensive source of power.

If much water enters the well with the oil, it is usual for the flowing pressures to remain so high that straight gas lift can carry the well to the point of depletion, and this has been demonstrated at the Saxet Heights, Saxet, and Hendrick fields in Texas; and at the Bosco, Iowa, Roanoke, Urania, and Zwolle fields in Louisiana.

If the fluid levels decline to low points due to tight sands as at Aransas Pass, Tex., the intermittent method of air lift can be employed to carry the wells to depletion, but it might be found that the combination plunger-pump, air-lift method could perform this operation at lower operating cost, and lift greater quantities of fluid than when employing intermittent flow methods.

If the fluid levels should decline to the point where straight gas lift cannot be employed efficiently, and where sand interferes greatly with the intermittent method, it may be possible to use the combination plunger-pump method with a large degree of success, both in lifting increased quantities of oil and in reducing the operating cost to a point lower than when using other methods.

References

1. C. E. Tweedle, Flow Valves in Gas Lift. International Oil. April 1940.
2. W. J. Sutton, Gas-Lift Production. International Oil. July 1940.
3. Shaw, S. F., Air-Gas Lift Practice in Seminole Field. Petroleum Development & Technology, Vol. 77 (1927), p. 100.
4. Shaw, S. F., Gas-Lift Results in Oklahoma City Field. Oil Weekly, November 18, 1940. p. 15.
5. ..... Power, April 22, 1913.
6. ..... Combination Pump and Flowing Device Used in Seminole. National Petroleum News, November 7, 1928. p. 37.
7. ..... Production Increased by Gas-Lift on Pumping Wells. Oil Field Engineering, October 1, 1929. p. 28.

Chart Facilitates Determination Of Tank Capacities

(Continued from Page 44)

The internal-diameter scales are also calibrated in equivalent circumferences for convenience. The capacity scale of the left-hand set of scales is calibrated in gallons as well as in 42-gal. barrels. Larger tanks are rarely calibrated in gallons.

Example: Find the capacity of a tank whose internal diameter is 17 ft. and whose height is 8 ft. Connect the point "17" on the internal-diameter scale with the point "8" on the height scale. The line so produced crosses the capacity scale at about "322" (barrels) and "13,500" (gallons). Calculated values for this tank are 323.4 bbl. and 13,584 gal., respectively.

If the desired tank height is greater than is shown on the height scale, determine the capacity of, for example, one-half the desired height, and multiply the result by 2. If the desired height is very small, increased accuracy may be obtained by determining the capacity of a tank of the same diameter and, for example, 10 times the height, and then dividing the result so obtained by 10.

The accompanying tables were prepared from American Petroleum Institute standards of March 1941.

Note: Large reproductions of these scales, including tables of internal diameters, heights, and capacities of common sizes of riveted, welded, and bolted steel tanks, may be obtained without obligation by addressing the author and company (Louis T. Monson at the Tretolite Co. of California), 5515 Telegraph Road, Los Angeles, Calif.

CAPACITIES OF BOLTED TANKS

Capacity (bbl.)		Dimensions (ft.)		
Nominal	Actual	Nominal internal diameter	Equivalent circumference	Height
100	95.80	9.23	29.00	8.04
200	191.64	9.23	29.00	16.08
250	266.28	15.39	48.35	8.04
500 H	532.56	15.39	48.35	16.08
750	798.84	15.39	48.35	24.12
500 L	522.01	21.54	67.67	8.04
1,000 H	1,044.02	21.54	67.67	16.08
1,500	1,566.03	21.54	67.67	24.12
800	804.57	26.74	84.00	8.04
1,600	1,609.15	26.74	84.00	16.08
2,400	2,413.72	26.74	84.00	24.12
1,000 L	993.53	29.72	93.37	8.04
2,000	1,987.06	29.72	93.37	16.08
3,000	2,980.59	29.72	93.37	24.12
5,000	5,037.45	38.64	121.39	24.12
10,000	10,218.49	54.98	172.73	24.17

CAPACITIES OF ALL-WELDED PRODUCTION TANKS

Capacity (bbl.)		Dimensions (ft.)		
Nominal	Actual	Nominal internal diameter	Equivalent circumference	Height
100	98.4	9.43	29.63	7.92
200	195.8	9.43	29.63	15.75
250 H	283.0	11.39	35.59	15.75
250 L	253.0	15.11	47.47	7.92
500 H	503.4	15.11	47.47	15.75
500 L	569.5	22.68	71.25	7.92
750 H	753.8	15.11	47.47	23.67
750 L	775.5	26.46	83.13	7.92
1,000 H	1,133.1	22.68	71.25	15.75
1,000 L	1,012.7	30.24	95.00	7.92
1,500 H	1,696.7	22.68	71.25	23.67
1,500 L	1,542.4	26.46	83.13	15.75
2,000	2,014.8	30.24	95.00	15.75
2,400	2,309.3	26.46	83.13	23.67
3,000	3,016.9	30.24	95.00	23.67

The above tables have been compiled from specifications of the American Petroleum Institute.

Operating Ideas

Extension for Bailer Dump

When bailing a well it frequently is the practice to dump the bailer directly into a pit at the side of the well, which constitutes a fire hazard. An operator in the Ada, Oklahoma, field has devised a bailer dump with an extension which carries the bailer discharge to a pit which can be located at a safe distance from the well. It is constructed from a section of 7-in. casing, closed at the upper end. In the top, a circular opening is cut, into which is welded a short riser of similar size pipe, and into which the bottom of the bailer empties. The riser is high enough to prevent splashing of the bailer discharge over the derrick floor. Short legs are welded on the underside to support the end slightly above the well floor to permit gravity flow of the fluid. As many lengths of pipe can be added as necessary to carry the flow to the pit.

Portable Pipe-Straightening Machine

A portable, hydraulic pipe-straightening machine constructed by an Oklahoma operator from miscellaneous second-hand equipment, has been utilized advantageously in straightening pipe at drilling locations. It is mounted on a four-wheel trailer constructed from the chassis of a salvaged light car. The hydraulic pump is driven by an old single-cylinder gas engine. The unit includes a folding track with adjustable stands for guiding the pipe through the machine.

Tripod for Derrick Trouble Light

Mounted on a light, easily handled tripod that can be placed where needed on the derrick floor, a portable floodlight which affords concentrated illumination where repairs must be made has proved a useful addition to the rig of one Gulf Coast operator. The stand is fabricated from light rods. Crossed and welded

braces provide the required rigidity to enable the unit to withstand drilling and transportation hazards. The ring forming the top of the stand is cut at one point, allowing it to be used as a hanger for the extension cord.

Guards for Wells in River Bottoms

Much of the Griffin field in Indiana is located in the Wabash River bottoms subject to overflows and swift-flowing flood waters. Special precautions must be taken to protect production equipment from damage by heavy drift wood. A major operator elevates all tank batteries and well equipment on steel structures above the high-water level. These structures in turn are protected on their upstream sides by guards constructed of piling driven deep into the sandy soil and braced with cross members of reclaimed pipe. Guards for pumping wells, including power-transmission poles, usually are V-shaped with the vortex outward to deflect the drift away from the structure.

CO$T Engineering

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

CEMENTING

DECEMBER 10, 1942

MODERN CEMENTING METHODS REDUCE RISK OF LOSS

THE cost of cementing oil wells using present-day methods is considerably higher than by the old bailer method in which a supposedly large enough quantity of slurry was deposited in the hole and then forced up around the casing, to a supposedly sufficient height. This method, of course, cannot be employed when the casing is perforated and a squeeze job is performed. The old method for producing from higher sands was to shoot the casing at or near the desired level, try to remove the outer strings and then set new pipe above the pay to be tested. Today the casing is simply perforated at the level of the formation to be tested, upper and lower water squeezed off, if necessary. If the test is negative, the perforations can be squeezed off and a new horizon can be perforated.

Added Costs

Among the elements of added costs in modern cementing practice are drillable cement plugs or retainers, specialized cements whose setting time is either retarded or accelerated, depending on conditions in the hole and surveys to determine the position of the cement. Many operators wishing to avoid these extra costs attempt to save money by returning to the older methods.

The total cost of a cementing job, however, cannot be computed when the job is completed. An unsatisfactory cementing job may cause expenses which continue for years and although an accountant would not add these expenses to the cementing account, the producer knows that that is where they should be placed.

The first requirement of a cementing job is that it provide a permanent and safe casing shutoff regardless of the type of formation. Once cement sets behind the casing, it may be found that it has channeled so that water finds its way down on the outside of the pipe and into the well. This adds materially to the lifting costs and often reduces the productivity of the well.

If water can find its way into the well, other fluids, mainly gas, can work out of the pay and behind the casing if the reservoir pressure is greater than the formation pressure of the water plus the weight of the column between the water sand and the bottom of the hole. In this case, gas passing up around the casing may lead to a blowout and all of the loss attending it.

Blowouts can often be corrected, but there are many instances of wells supposedly in good working order which have developed leaks around the casing and have sometimes blown out with complete loss of the well. The added cost of these cement jobs is thus a new well and the loss of production during the period between the blowout and the completion of the second well.

Drilling of relief wells is rarely necessary to bring wells under control when they blow out after cement has been set. These bad blowouts, often accompanied by cratering, generally happen during drilling. However, it is by no means impossible that a blowout and loss of control of the well may take place after an inadequate cementing job.

Thief Sands

A factor which may not be taken into consideration but which may lead to greater loss than a spectaular blowout is the presence of a thief sand above the pay. Gas and oil may pass up through the channeled cement and find a porous zone with a low formation pressure with the result that they will enter it and saturate it. If the thickness and porosity of the thief sand is equal to that of the pay, nearly half of the total fluid in the pay may eventually find its way into the upper sand. This will result in the loss of nearly half of the reservoir energy which speeds up the time when the wells will have to go on artificial lift. The reason that the thief sand will not take half of the fluid from the reservoir is, of course, that it already contains some fluid.

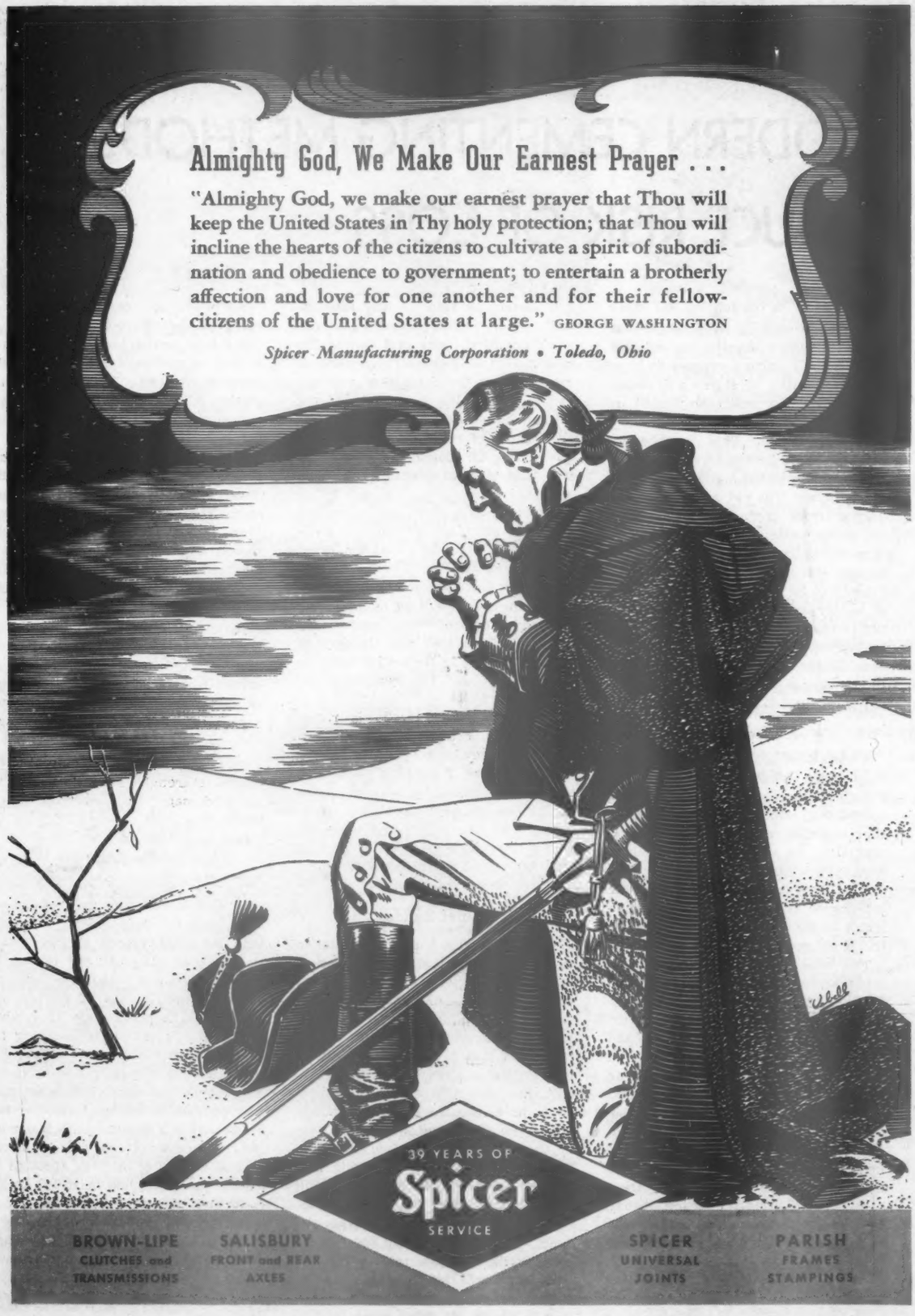
As production continues and pressures in the reservoir drop, some of the lost oil will return down into the bottom of the well, but much will be permanently lost. The more rapid depletion of the reservoir energy will not only add greatly to lifting costs but it will also reduce the amount of oil produced, not only by the amount lost in the thief sand, but also by the amount lost by the depletion of energy. This oil will be more viscous than under original conditions by reason of the loss of dissolved gas and will not flow to the well, making secondary recovery methods necessary.

In this way, an unsatisfactory cementing job may cause the loss of more than half of the revenue expected from a pool and it is possible that this loss will not be suspected because of the fact that all of the evidence is below ground.

Additional expenses may be incurred through lawsuits resulting from damage to the property of others.

Plugging

Another cementing operation which may cost much more than the operation itself is the plugging of wells prior to abandonment. Failure to use an adequate plug and the use of insufficient cement has many times resulted in the flooding of surrounding wells. This is particularly true when the casing is cut above the plug for salvage. In one case, where there was only 15 ft. of cement in the bottom of the casing, the overlying water simply pushed it out and flooded two wells within 2 months, with water appearing in four others. This job necessitated redrilling the well through all of the junk that had been left in the hole and putting 15,000 sacks of cement in the well before the water could be shut off. Naturally, the first wells to be affected were on the same lease so that the operator had a selfish reason for doing a good job in the first place.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"Almighty God, we make our earnest prayer that Thou will keep the United States in Thy holy protection; that Thou will incline the hearts of the citizens to cultivate a spirit of subordination and obedience to government; to entertain a brotherly affection and love for one another and for their fellow-citizens of the United States at large." GEORGE WASHINGTON
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Engineering Fundamentals

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL No. 57

DECEMBER 10, 1942

CALCULATIONS BASED ON NATURAL GAS ANALYSIS

NATURAL gas is usually a mixture of several hydrocarbon gases and certain other gases. Some common constituents of natural gas were listed in Table 1, Installment 13, of this series. All of the compounds listed in the table referred to are not gases at ordinary temperatures but, if not, their vapors are carried in many "wet" natural gases. It should be stated, too, that certain other gases not listed in the table may be found, at least in small quantities, in certain samples of natural gas; these include hydrogen sulfide, helium and other gases.

In many engineering calculations involving natural gas, it is desirable to calculate, from the volumetric analysis, the following items:

1. Molecular weight.
2. Specific gravity.
3. Density at a given pressure and temperature.
4. Weight analysis.

The molecular weight of a natural gas may be calculated by multiplying the molecular weight of each pure component by its mol fraction. This product represents the weight of the one component in 1 mol of the mixture. The sum of the weights of the individual components, then, represents the weight of 1 mol of the mixture, i.e., molecular weight. (See Installment 13).

Example 1.

Problem.—Calculate the molecular weight of a natural gas which is 62 per cent methane, 23 per cent ethane, and 15 per cent nitrogen on a volume basis.

Solution.—Molecular weights for the component gases are given in Table 1, Installment 13. The following tabulation shows the calculations involved:

(1) Component	(2) Molecular weight		(3) Mol fraction		(4) Weight
Methane	16	×	0.62	=	9.92
Ethane	30	×	0.23	=	6.90
Nitrogen	28	×	0.15	=	4.20
					21.02

The molecular weight of the gas is the sum of Column 4, or 21.02.

The specific gravity of a gas is the ratio of the weight of a given volume of the gas to the weight of an equal volume of air under like conditions of temperature and pressure. In calculating specific gravity, based on an analysis, it is convenient to use 1 mol of the natural gas as a basis. Since 1 mol of gas will occupy the same volume as 1 mol of air if both are at the same temperature and pressure, the ratio of the weight of 1 mol of gas to the weight of 1 mol of air will give the specific gravity. That is, specific gravity of the gas equals molecular weight of the gas divided by molecular weight of air. It is known that, for practical purposes, the volumetric analysis of air is: nitrogen —79.1 per cent, oxygen 20.9 per cent. Using the type of calculation illustrated in Example 1, the molecular weight of air is found from this analysis to be 28.8. In many engineering problems, particularly when dealing with combustion, the molecular weight of air is frequently used.

Example 2.

Problem. — Calculate the specific gravity of the gas used in Example 1.

Solution: Specific gravity

$$= \frac{\text{M.W. of gas}}{\text{M.W. of air}} = \frac{21.02}{28.8} = 0.73$$

It should be realized that the specific gravity of gas is generally determined directly, since it is often needed when one is not concerned about the exact analysis of the gas, and since the measurement of specific gravity is simpler than the determination of gas analysis.

It is often desirable to compute, from gas analysis, or molecular weight, the density of a given gas at a given pressure and temperature. In a sense the molecular weight of a gas is an expression of the density, since density refers to the weight of a given volume and molecular weight represents the weight of a certain definite volume. This volume occupied by 1 mol* of any gas is 379 cu. ft. at 14.7 lb. per sq. in., absolute, and 60° F. So thus, it could be said that the density of air at this pressure and temperature is 28.8 lb. per 379 cu. ft. The comomn unit for expressing gas density, however, is pounds per cubic foot. So, the density of air at 14.7 lb. per sq. in., absolute, and 60° F. is 28.8/379, or 0.076 lb. per cu. ft.

*Mol in this discussion is used to mean pound-mol, as defined in Installment 13.

Example 3.

Problem. — What is the density in pounds per cubic foot of the gas given in Example 1 when the gas is at a pressure of 30 lb. per sq. in. gage, and a temperature of 100° F.? Barometric pressure is 13.5 lb. per sq. in.

Solution.—The molecular weight of the gas is 21.02. This weight of gas in pounds will occupy a volumn of 379 cu. ft. at 14.7 lb. per sq. in., absolute, and 60° F. The density then at the standard pressure and temperature given is 21.02/379, or 0.055 lb. per cu. ft.

According to the perfect gas laws (see Installment 10) the density of any particular gas varies directly with the absolute pressure and inversely with the absolute temperature.

Then, the desired density is

$$d = 0.055 \times \frac{30+13.5}{14.7} \times \frac{460+60}{460+100}$$
$$= 0.151 \text{ lb. per cu. ft.}$$

In certain considerations it is convenient to have a gas analysis expressed on a weight basis. In order to do this, it is only necessary to calculate the weight of each component in a certain quantity of the gas and divide this weight by the total weight of all components to obtain the weight fraction of the one component.

Example 4.

Problem.—Calculate the analysis of the gas of Example 1 on a weight basis.

Solution.—Referring to Column 4 of Example 1, the weights given represent the weight of each component in 1 mol of gas.

Then the weight fraction of the various components are obtained as follows:

Methane 9.92/21.02=0.4719, or 41.19%
Ethane 6.90/21.02=0.3283, or 32 83%
Nitrogen 4.20/21.02=0.1998, or 19.98%

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

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Journalog

A FEATURE OF THE OIL AND GAS JOURNAL — No. 22

DECEMBER 10, 1942

DEEP ROCK OIL CORP. 1 DAILY

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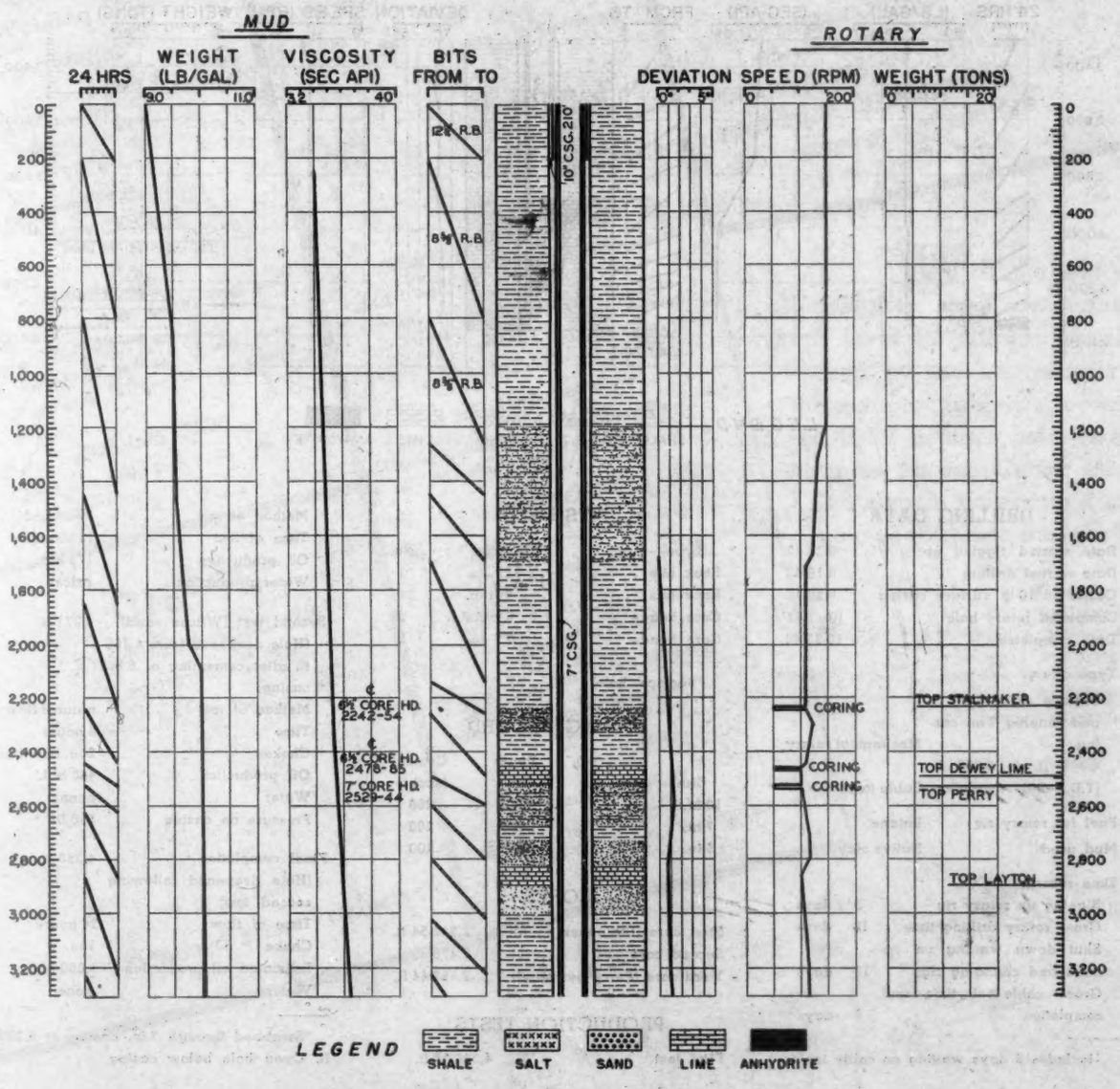
CONTRACTOR

AJAX DRILLING CO., TULSA

Discovery Well of East Liberty Pool, Noble County, Oklahoma



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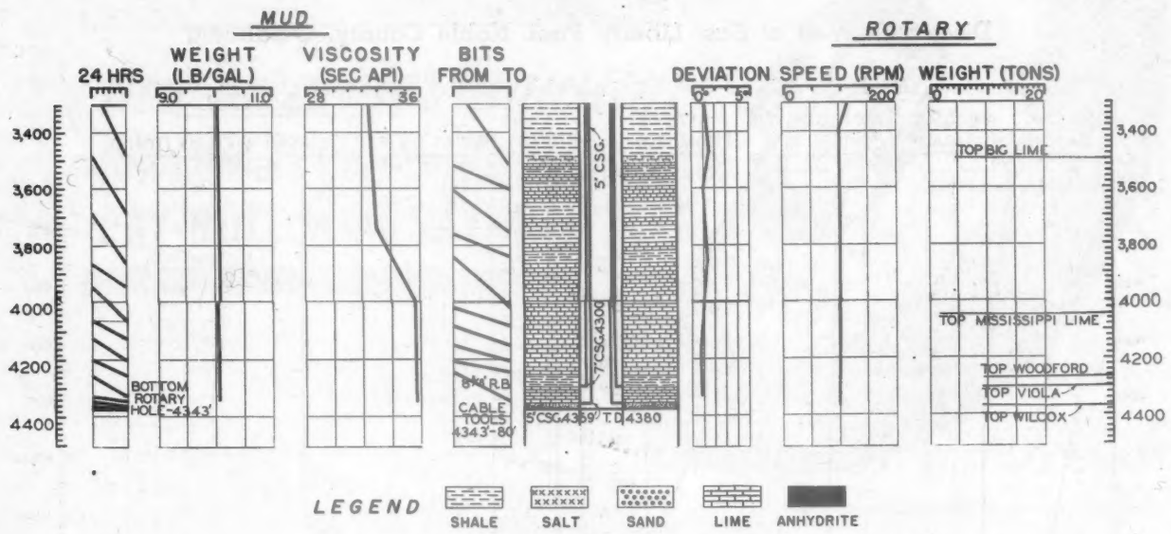
Journalog

DECEMBER 10, 1942

Discovery Well of East Liberty Pool, Noble County, Oklahoma (Continued)



DRILLING DATA

Date started rigging up	9-13-42
Date started drilling	9-19-42
Cemented 10-in. surface casing	9-20-42
Completed rotary hole	10- 7-42
Date completed	10-23-42
Type of rig:	
Surface to 4,343 ft. and running 7-in. casing	Mechanical rotary
4,343 ft. to 4,380 ft. (T.D.) and completion	Cable tools
Fuel for rotary rig	Butane
Mud used	Native clay
Time record:	
Rigging up rotary rig	5½ days
Gross rotary drilling time	18 days
*Shut down waiting on cement and changing rigs	12 days*
Gross cable-tool time and completion	6 days

*Includes 6 days waiting on cable tools.

BITS USED

Type—	Size.	No.
Rock bits	12¼-in.	*1
Rock bits	8⅝-in.	21
Core heads	6½-in.	2
Core heads	7 -in.	1

*Surface hole.

CASING RECORD

Size—	Depth (ft.)	Cement (sacks)
10-in.	210	200
7-in.	4,300	200
5-in.	4,359	200

CORES

First core (Stalnaker sand)	2,242-54 ft.
Second core	2,478-85 ft.
Third core (Perry gas sand)	2,529-44 ft.

PRODUCTION TESTS

First test ..... 4,348-59 ft.

Method of test	Swabbed*
Time of test	13 hours
Oil production	175 bbl.
Water production	trace
Second test (Wilcox sand)	4,371 ft.
(Hole deepened from 4,359 ft. after cementing of 5-in. casing)	
Method of test	natural flow
Time	6 hours
Choke	2-in. flow line
Oil production	455 bbl.
Water	none
Pressure on casing	550 lb.
Final completion	4,380 ft.
(Hole deepened following second test)	
Time of flow	24 hours
Choke	1-in.
Estimated oil production	1,000 bbl.
Water	none

*Swabbed through 7-in. casing at 4,300 ft. Open hole below casing.

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¾	12	14	1
¾	14	16	1¼
¾	16	10	

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⅝	18
¾	14
¾	16
¾	18
1	12
1	14
1	16
1	18

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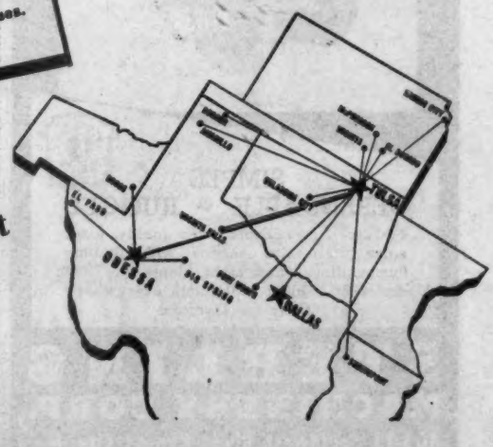

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REFINERY ACTIVITY AND EXPANSION

Oil Refiners Ordered to Report Operating Cost Data to OPA, Showing Impact of War

WASHINGTON, D. C.—The Office of Price Administration this week awaited reports from petroleum refiners throughout the country by which it will attempt to establish the impact of governmental requirements and war emergencies upon the manufacturing branch of the industry.

Last week, OPA issued an order requiring quarterly operational reports from all refiners which, refiners contend, is the first direct acknowledgment of OPA that petroleum processors have suffered financially from exigencies of war.

The OPA order, issued under the Emergency Price Control Act, requires specific data on the nature, capacity, yield, and profitableness of plant operations. OPA Report Form SSO-55 has been sent by registered mail to all refineries affected. Reports are to cover quarterly periods beginning January 1, 1941, through September 30, 1942, and are returnable on specified dates.

With such records of normal refinery operations available, OPA will be able to expedite decisions on proposed changes in price structure. It will also be able to gage without delay the immediate effect of proposed or actual demands arising from the impact of war emergencies and future governmental regulations and requirements.

The report forms follow closely the standards of the Bureau of Mines as to type of plant, equipment, capacity, and other operations. Also to be included are production costs and total finished production values of the plant. The new order is dated November 18, 1942.

Thus, the refining industry will be in position to tell specifically what higher costs have been incurred by the necessity of receiving crude via more expensive transportation methods, wage increases, and the shift from maximum gasoline production to greater recovery of low-value fuels.

Manufacturers Limited In Use of Fatty Acids in Grease

WASHINGTON, D. C.—In order to reduce further the consumption of fats and oils from which glycerin can be obtained, Petroleum Administrator Harold L. Ickes last week issued Recommendation 58 that all manufacturers of lubricating greases reduce their use of fatty oils, commencing January 1, 1943.

Deputy Administrator Ralph K. Davies pointed out that certain long service, heavy-duty and high-temperature greases are excluded from the restrictions because grease made from fatty acids may not have the required service qualities. Greases purchased by the Army, Navy, and Office

Sketches of Plant Operators . . .

EDWIN DAVIS CUMMING, vice president in charge of manufacturing east of the Rocky Mountains for Shell Oil Co., Inc., last week accepted appointment as director of the Refining Division, Office of Petroleum Coordinator, and is now in Washington, D. C., on leave from his civilian position.

Nineteen years of experience in all phases of petroleum manufacturing operations support his appointment to the OPC position which has been vacant since resignation of Wright W. Gary.

Mr. Cumming become a fireman in Shell's Long Beach, Calif., refinery in 1923. From 1926 to 1930, his assignment was chiefly concerned with developments in natural-gasoline stabilization plants and with the uses of butane and propane. During this time, he participated in the initial studies made by Shell in the mathematical approach to problems of fractionation and distillation and had an active part in designing and constructing Shell stabilization plants in southern California. In 1930, he was transferred to San Francisco, Calif, and became technical assistant in the manufacturing department, specializing in butane and other light products of natural gas and crude oil.

He was appointed assistant manager of the Dominguez refinery in 1935 and in May, 1937, he was made manager of Shell's Martinez plant. Mr. Cumming was appointed manager of the company's Wood River, Ill., refinery in 1938 and remained there until his election as vice president and promotion to the general supervision of manufacturing operations in the eastern part of the country.

As Director of Refining for OPC, Mr. Cumming will work under the guidance of Assistant Deputy Coordinator Bruce K. Brown.

No other organizational changes are contemplated in the Refining Division.

of Lend-Lease Administration, as well as those exported outside the United States, Canada and Alaska are excluded for similar reasons. All other greases are to be made only with a percentage of the fats and oils formerly used, through the substitution of fatty acids.

On April 15, 1943, all lubricating grease manufacturers are required to file a report on the amount of fats and oils used and grease made during the first calendar quarter year of 1943, with the director of refining of the Petroleum Administration. Similar reports will be due for each calendar quarter on the 15th of the month following each quarter.

Rubber Polymerization Plant To Be Built in Kentucky

WASHINGTON, D. C.—The Rubber Reserve Co. has made a contract with the National Synthetic Rubber Corp. to operate a new government-owned synthetic-rubber plant to be built in Kentucky by the Defense Plant Corp., a subsidiary of Reconstruction Finance Corp., Secretary of Commerce Jesse H. Jones announced last week. It is expected that the plant may be completed about June, 1943.

Formed for the specific purpose of operating the new government-owned plant the National Synthetic Rubber Corp. is owned jointly by five rubber companies including Goodall Rubber, Inc., and Hamilton Rubber Manufacturing Co., both of Trenton, N. J.; Hewitt Rubber Corp., of Buffalo, N. Y.; Lee Rubber & Tire Corp., of Conshohocken, Pa., and Minnesota Mining & Manufacturing Co., of St. Paul, Minn.

The president of National Synthetic Rubber Corp. is W. W. Benner of Lee Rubber & Tire Corp. Dr. B. J. Oakes of Minnesota Mining & Manufacturing Co. has been chosen executive vice president and general manager in charge of operations at the plant. William M. Collins, Jr., also of Minnesota Mining & Manufacturing, will be vice president and treasurer, and B. J. Moffatt of Hewitt Rubber Corp. will be vice president.

Eagle Oil & Refining Co. Plant In California Resuming Work

SANTA FE SPRINGS, Calif.—Operations at Eagle Oil & Refining Co.'s plant near this city are to be resumed in the near future, it was announced last week by J. J. Sterling, president. The plant has been idle in recent weeks, pending completion of a repair and modernization program.

The Eagle refinery has crude capacity of 5,500 bbl. daily and includes a 450-bbl. cracking unit.

Rumors that the plant would be dismantled and shipped to Soviet Russia under lend-lease arrangements through the Treasury Department were denied by Mr. Sterling.

Douglas Refinery Sale Forces Change in Western Operations

LOS ANGELES, Calif.—Sale of the Douglas Oil & Refining Co. plant at Gardena, Calif., for shipment to the U.S.S.R., will require changes in manufacturing arrangements by several Pacific Coast companies.

In the first months of the defense program, several small refining companies in California arranged to divert their crude supplies to the Douglas plant and to draw their product requirements from this centralized manufacturing operation. Disposal of the plant interrupts the common processing arrangements and forces participants to negotiate another similar contract, or resume operations at their individual refineries.

Dismantling work on the Douglas refinery will start in the near future, although certain delays will be unavoidable because of the necessity of giving adequate notice to parties in the manufacturing contract.

Most observers anticipate that smaller refiners relying on Douglas' processing facilities will arrange other disposition of crude rather than reopen plants that have high operating costs.

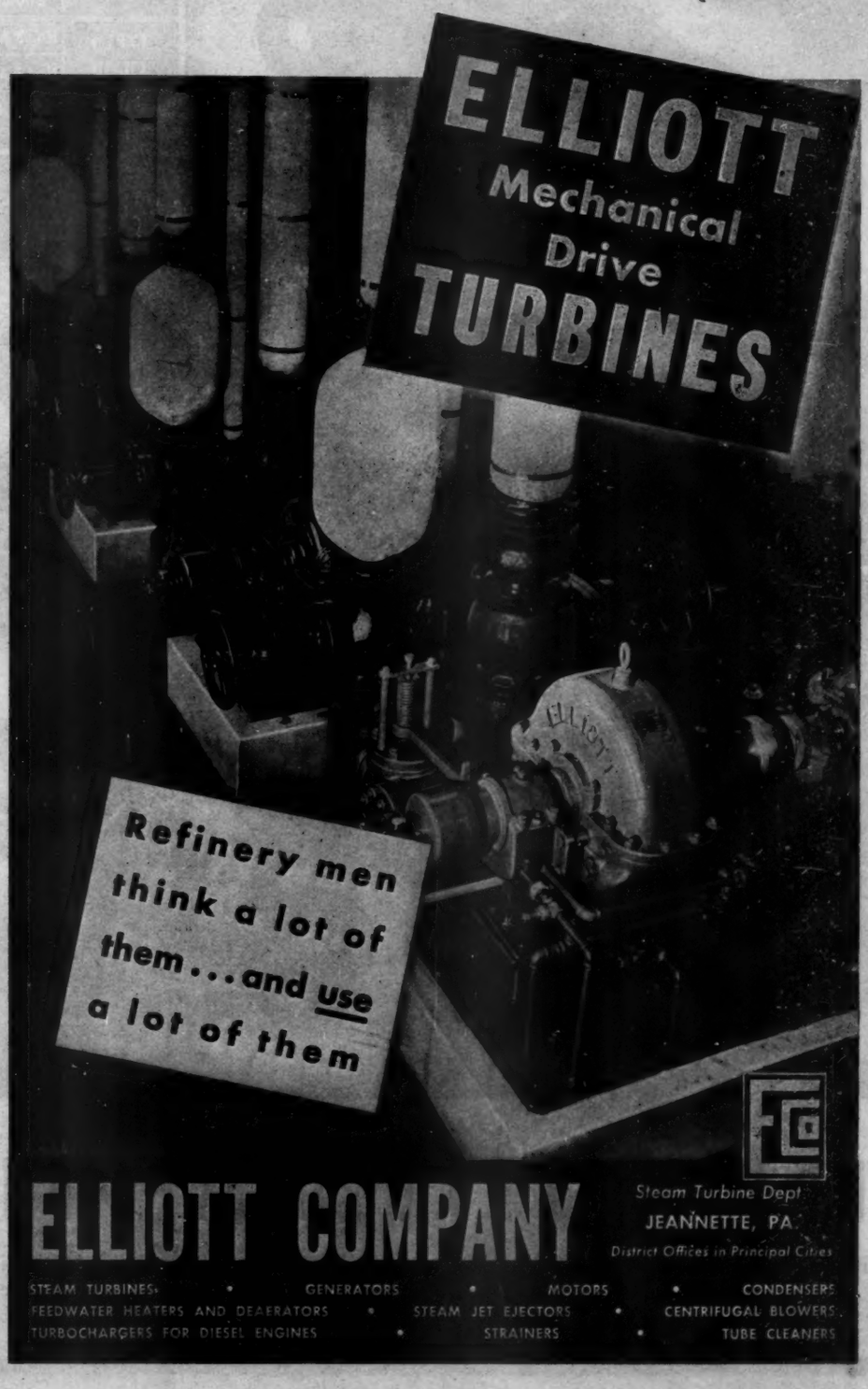
Refiners May Deduct Cost Of Plant-Security Facilities

WASHINGTON, D. C.—Cost of material for blackout purposes as well as other items for use in air-raid precaution and protection by a taxpayer engaged in a trade or business, where the item is used in connection with his business, "should be treated as a current expense and deducted from gross income in computing net income for federal income-tax purposes, in the year in which the expenditure is made," Internal Revenue Bureau has ruled.

This ruling affects the many oil refineries and other establishments in the industry which have spent money to prepare for invasion by enemies.

However, the cost of such items for use in connection with a taxpayers' residence is a personal expense, and therefore not an allowable deduction in his federal income-tax return.

At the same time, Internal Revenue Bureau ruled that in cases where "a bomb shelter would be useful in the ordinary business operations of the taxpayer at the expiration of the war period, particularly where the cost of construction is substantial, it is the opinion of this office that the taxpayer should be required to capitalize the expenditure, and should be permitted to deduct depreciation on the basis of the estimated life of the structure."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SPECIFICATIONS				
	PITCH IN INCHES	NUMBER LINKS IN APPROX. 10 FEET	ULTIMATE STRENGTH, POUNDS	WEIGHT PER FOOT, POUNDS
No. 3 1/8 CHAIN	Single 3.125	39	115,000	12.6
	Double 3.125	39	115,000	24.6
TYPE F CHAIN	No. 3 API 3.075	39	70,000	8.5
	No. 4 API 4.063	30	170,000	17.2
ASA No. 200 CHAIN	ASA No. 200 2500	48	95,000	11.0

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Check Sprocket Alignment

☆ Check all sprockets for alignment on shafts. Out-of-line sprockets develop side pull that throws the load on the sides of the sprocket teeth and on one side of the chain. Such alignment is a common cause of excessive sprocket and chain wear.

Check Chain Tension

☆ Chain should carry slightly more slack than belting. Excessive tension causes unnecessary wear on chain and creates wasteful bearing friction. Insufficient tension may permit chain to jump the sprocket or ride the teeth and cause breakage.

Lubricate Frequently

☆ Frequent lubrication with a good grade of lubricating oil applied to the inside of the chain (upper side of lower run) while it is running slowly is a most important factor in extending chain life. Do not attempt to use crank case drainings from other machinery for this purpose as this worn out oil will not withstand high pressure bearing loads. Reservoirs for drip and forced-feed lubricating systems should be kept filled with a good grade of clean oil and the system checked frequently to assure constant lubrication to the chain in operation.

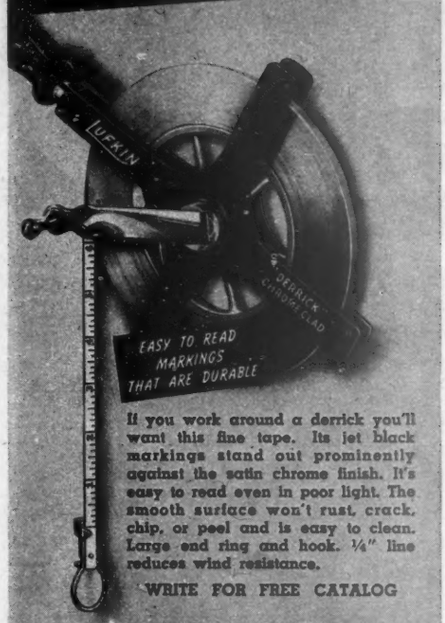
Keep Chain Clean

☆ A deposit of gummed lubricant on the surface of chain rapidly collects dust and dirt that becomes a grinding abrasive to sprockets and chain. To clean chain, remove it from the sprockets, wash it thoroughly in light oil and relubricate with regular lubricant before putting it back into operation. If chain is to be out of operating service for six months or more remove it from sprockets and thoroughly clean it with gasoline and relubricate before putting it in storage. Before chain is again put into service it should be cleaned again with light oil and reoiled with regular lubricant.

Check Sprocket Wear

☆ Inspect sprockets frequently for irregularity in tooth wear that would cause chain damage. Worn sprockets should be immediately repaired or replaced. Wear that has developed a hook on the driving side of sprocket tooth can be removed by grinding. When replacing sprockets that are beyond repair be sure that they are accurately made.

"DERRICK" CHROME CLAD STEEL TAPES



If you work around a derrick you'll want this fine tape. Its jet black markings stand out prominently against the satin chrome finish. It's easy to read even in poor light. The smooth surface won't rust, crack, chip, or peel and is easy to clean. Large end ring and hook. ¼" line reduces wind resistance.

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Bridge the gap between high speed steel and the carbides. Reclaim old, and make new cutting tools by welding. The process is simple.

To fabricate a typical tool:

1. Undercut carbon steel shank, leaving a fillet for ease in welding.
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3. Hot wipe, to approximate shape, to save grinding.
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Hard Surfacing Alloys and Overlay Metals

Pipe-Line Activity

Stringing Operations Progress For W.E.P. Extension

A hundred miles or more of 24-in. pipe that will carry oil from Norris City, Ill., to the Atlantic seaboard have been put down along the route through Pennsylvania, ready for welding, the Petroleum Administration said Friday.

Preparations for installation of the 857-mile eastward leg of the pipe were reported going forward rapidly.

At the beginning of this week 491 miles of 24-in. pipe for the line had been completed for the 531-mile Texas-Illinois leg of the War Emergency Pipelines, Inc., project.

The crews of four spreads have already arrived at sections on the eastward extensions; these belong to the organizations of Oklahoma Contracting Co., O. E. Dempsey Construction Co. and W. A. Bechtel Co. Other crews are moving in this week. There has been zero weather with snow in certain sections of the route and in other sections there has been much rain.

When shipments arrive at Norris City through the Texas-Illinois leg early next year deliveries will go by rail from a loading rack to East Coast destinations and by a connection with the Illinois Pipe Line Co. system to loading racks at Martinsville, Ill., Bridgeport, Ill., and Lima, Ohio, where they will be forwarded eastward by tank car.

There has been no delay in the construction of the War Emergency pipe line because of deliveries of pipe and none is expected, Hiland G. Batcheller, director of the Steel Division of WPB, has announced.

"All of the pipe for the first section of the War Emergency pipe line from East Texas oil fields to Norris City has been produced and delivered," Mr. Batcheller declared.

"Approximately 70,000 net tons of pipe for the second section from Norris City to the eastern seaboard will be produced and delivered by the end of the year and the remaining 150,000 tons of pipe are scheduled for production during the first quarter of 1943," he added.

The eastward course of the 24-in pipe line, which is to be completed next June, roughly follows this path from Norris City:

Through Indiana—south of Princeton, north of Paoli and Seymour and midway between Columbus and Vernon; through Ohio—north of Hamilton, Cincinnati and Washington Courthouse, south of Columbus and north of Lancaster; through West Virginia—south of Moundsville and Wheeling; through Pennsylvania—north of Waynesburg and Uniontown, then east to Phoenixville Junction, whence 20-in. branches will go to Philadelphia and to Bayonne, N. J.

The War Production Board for several weeks has been considering a request by Petroleum Administrator Harold L. Ickes for a second 20-in. pipe line from Texas to the East Coast.

The part of the extension, known as Section 24, which will be constructed by Jones & Brooks, between Lambertville and Bayway, N. J., extends for a distance of 47 miles and not 17 miles as previously reported.

Construction Progresses for Project Five Barge Terminal

Following the completion of construction of the 158-mile 10-in. products line from El Dorado to Helena, Ark., work has been going forward on the building of a manifold to serve the terminal at Helena where plans call for loading barges which are to move shipments up the Mississippi and Ohio rivers. This project is a joint operation by Gulf, Magnolia, and Texas Co. interests, conducted by an organization known as Project Five Pipe Line Corp., the affairs of which are directed by the Gulf Pipe Line organization. Construction is handled by Williams Brothers Corp.

Central Pipe Line Co. Lays Line to Illinois System

The Central Pipe Line Co. has started work on a 4-in. line from the Cabbage Corners pool, Illinois, to a connection with the Illinois Pipe Line Co. at Lancaster, Ill.

Pipe-Line Construction Has Increased Steadily

A review of available statistics shows a progressive increase in the rate at which pipe lines have been constructed in the last 5 years for crude oil, refined products and natural gas. According to these, construction for these three classes of lines in the United States has been as follows: 1937, 2,000 miles; 1938, 2,500 miles; 1939, 5,000 miles; 1940, 6,000 miles; and 1941, 8,500 miles. Mileage for this year will probably be found to be close to that of last year; 1943 starts off with the construction of the War Emergency extension getting under way and the prospect

Anywhere!

Buckeye Trenchers minimize right-of-way work. Dig in any soil. Ruggedly constructed. Faster, Readily maneuvered. Model 12 (shown) for gathering, gasoline and small natural gas lines. Models 32 or 48 for main lines. The standard trenchers for pipeline work.

BUCKEYE TRACTION DITCHER COMPANY
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Built by Buckeye
TRENCHERS SHOVELS CRANES
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This Pipe Line Coating Gives 4-Way Protection

NO-OX-ID combinations provide positive protection under all soil conditions. They insulate against electrical effects, resist soil action, and repel moisture. In addition, NO-OX-ID contains rust inhibitors which stop any underfilm corrosion which may already be present. Dearborn Chemical Company, Dept. K, 310 S. Michigan Ave., Chicago.

NO-OX-ID
IRON RUST
Rust Preventive Pipe Coatings

for a Gulf Coast-East Coast products line as well as for an extensive natural-gas trunk line.

Buckeye Stockholders Approve of Merger

At a special meeting last week holders of approximately 82 per cent of the stock of the Buckeye Pipe Line Co. voted to adopt an agreement of merger with the Indiana Pipe Line Co. The merger agreement has already been approved by approximately 51 per cent of the stockholders of the Indiana Pipe Line Co. This is the first step towards the consummation of the unification of these companies and the Northern Pipe Line Co. and New York Transit Co.

Suit Threatens Sale of Panhandle Eastern Stock

A suit to restrain the Columbia Oil & Gasoline Corp from proceeding with a plan for sale of its interests in Panhandle Eastern Pipe Line Co. was disclosed last week with the filing of a motion to dismiss the suit on the ground that the Supreme Court lacks jurisdiction in the matter.

The plaintiff in the action, August B. Becholtz, owner of 1,100 shares of common stock in Columbia Oil & Gasoline Corp, contended that the plan was unfair to common stockholders of the corporation.

The plan involves the distribution of all other assets of the Columbia corporation after the sale of its Panhandle interests. Common stockholders would receive $1 in cash for every share and Columbia Oil & Gasoline Corp. would be liquidated.

The motion for dismissal was made by Columbia Gas & Electric Corp., the parent company of Columbia Oil & Gasoline. Columbia Gas & Electric would receive all remaining assets after the sale of the Panhandle interests, payment of indebtedness and the distribution to common stockholders.

Stockholders of Columbia Oil & Gasoline Corp. will convene December 30 at Wilmington, Del., to act on requests of the management for approval of sale to Phillips Petroleum Co. of Columbia's control of Panhandle Eastern Pipe Line Co. The management is also requesting approval of plans to conclude affairs of the corporation and dissolve the company. Columbia Oil & Gasoline Corp. is a subsidiary of Columbia Gas & Electric Corp., New York.

Pipe-Line Personalities . . . J. French Robinson

J. FRENCH ROBINSON, president, East Ohio Gas Co., is a native of Elizabeth, W. Va. As a boy he assisted his father in his duties connected with the operation of a gas plant in that community. He was graduated from West Virginia University in 1915.

In 1921 he joined the organization of Peoples Natural Gas Co. as geologist and engineer. For 2 years he was engaged in studying the various sand horizons of the Appalachian fields. This entailed the examination of data collected from more than 15,000 wells in Pennsylvania, Ohio, West Virginia and Kentucky. In recognition of the value of what was accomplished by this undertaking the University of Pittsburgh gave him the honorary degree of doctor of science in 1929.

He became manager of several companies in 1930 including Lycoming Producing Corp., New York State Natural Gas Corp. and Keuka Construction Corp.

Mr. Robinson was elected vice president of the Peoples Natural Gas Co. and Columbia Natural Gas Co. in 1933. In 1936 he became president of both companies. Under his direction Columbia was later consolidated with Peoples.

In 1940 he was elected president of East Ohio Gas Co. which has a system of more than 6,854 miles of pipe in sizes between 2-in. and 36-in. The company's experience with the storage of compressed natural gas in recent years for the purpose of taking care of peak loads has been observed with much interest by the industry.

Mr. Robinson has published several papers on geology, gas production, prospecting and related subjects. He is a member of the American Institute of Mining and Metallurgical Engineers, American Association of Petroleum Geologists. Recently he has served as chairman of the Natural Gas Section of the American Gas Association.

Another WHEATLEY—with 5 Cylinders

25,000 BPD at 400 Lbs.

5 Cylinder, 2½" to 5¾" x 8"

WHEATLEY QUINTUPLEX PUMP

Description	Liner	Gals. Per Min.	Bbls. Per Hour	Pressure Per Square Inch	Max. H.P. Req'd
5¼"x8"—V-Belt Drive	3"	109	156	1605	120
	3½"	154	220	1137	120
Fig. 5830	4"	206	294	850	120
Three Cylinder	4½"	265	380	658	120
85 R.P.M.	4¾"	297	424	590	120
	5"	331	473	529	120
	5½"	404	577	434	120
	5¾"	442	631	396	120
	3"	182	260	1605	200
5¼"x8"—V-Belt Drive	3½"	257	367	1137	200
	4"	344	492	850	200
Fig. 5850	4½"	442	632	658	200
Five Cylinder	4¾"	495	707	590	200
85 R.P.M.	5"	552	789	529	200
	5½"	673	961	434	200
	5¾"	735	1050	396	200

For Main Station, Booster Station or Standby
Designed for Temporary or Complete Replacement Unit

Just off the assembly line is our most recent development: a pump weighing less than 9500 lbs., capable of developing 1000 bbls. per hour at 400 lbs. pressure, with five individual fluid cylinders and twenty individual valves in pot type fluid cylinder.

LESS WEIGHT SURGE **MORE** VOLUME PRESSURE

- Ten Impulses to One Turn of Crankshaft at 85 r.p.m.
- Reduces Surge Conditions To A Minimum
- Individual and Interchangeable Parts.

Designed to operate as two distinct units if desired, by placing a valve between the set of 3 cylinders and the set of 2 cylinders. These sets can operate with each having a different size liner making it possible for this unit to develop two different pressures at two different volumes.

Interchangeable liners in half-inch graduation from 3" to 5¼" with an 8" stroke, giving wide range of pressure and capacity.

ALSO AVAILABLE IN 3 CYLINDERS
(AND A 2½" TO 4" x 6" IN 5 CYLINDERS)

LARGE CAPACITY ● PORTABLE UNIT

Quickly loaded complete with engine on one truck, within highway load, width and height limits. Complete details on application. Write for Bulletin J-12-10.

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Action is demanded. Modern methods alone can meet today's requirements. Yes, and war conditions actually magnify the outstanding advantages of STURDYBILT demountable prefabricated houses.

Immediate requirements for Lease Houses, Bunk Houses, Field Offices and many other buildings usually can be filled from stock. In most cases, the new STURDYBILT Houses can be made ready for occupancy within three to five days after they are selected and ordered. They furnish standardized, comfortable quarters equal in quality to those that would take weeks of planning and building if materials and labor were available. Hundreds of style combinations are possible, for all wall sections used in construction are interchangeable.

Demountability is a distinct advantage, whenever oil field housing is considered, for it is never known how long field operations will continue in any one place. Then, whenever it is decided that the STURDYBILT Houses are no longer required in any one location, they may be easily and quickly moved to a new field. There is little loss of value in this "salvaging" operation.

Small Section of Storage

Completed Panels Ready for Shipment

Trucks Loaded with Sturdybilts for Defense Project

A STURDYBILT may be taken down, transported and rebuilt in a very short time. Re-painting and foundations are about the only maintenance expense involved where STURDYBILTS are used.

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Inquiries will be given prompt attention. Special floor plans, together with quotations, will be sent upon request.

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Bunk Houses
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Warehouses
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SOUTHERN MILL & MANUFACTURING CO.

Wichita, Kansas TULSA, OKLAHOMA Longview, Texas

FIELD DEVELOPMENTS...

HIGHLIGHTS FROM THE WEEK'S NEWS—

Discovery of a new oil field at East Strand by Tide Water Associated Oil Co. brings the number of discoveries in California for the year to date to six. Of this group, two are gas fields that produce no crude oil. These are Bowerbank in Kern County and Roberts Island in San Joaquin County. New oil fields discovered this year are Buena Park in Orange County, Antelope Plains in Kern County, Wheatville in Fresno County and East Strand in Kern County. It will not be possible to give East Strand much of a reserve in this year's estimates of reserves due to the limited data available, but some idea of its productivity should become available within the next several months if the operator is permitted to continue development work. The state has been drawing on crude-oil reserves for the past 3 or 4 years as discoveries during this period have not shown the ability to produce at a high enough rate to justify the expectation of becoming of primary importance. The Buena Park field found in March 1942 looks quite discouraging and Wheatville is producing from the Eocene and shows too high a gas-oil ratio. Antelope Plains discovered in May may make a good field, but present indications are that it will not prove of major importance.

With the end of the current year only a few weeks away it can be safely stated that California will again draw on reserves. Even if several additional discoveries were to be made within the next week or 10 days there would not be enough data available to give a new field much of a reserve. As far as extensions and deep drilling are concerned a check indicates that increases in reserves can be given Newhall Potrero and San Martinez in Los Angeles County, Ventura Avenue in Ventura County, Paloma in Kern County and several other minor adjustments in existing fields. California will produce about 247,000,000 bbl. of crude oil during 1942 which means prospectors must discover new fields capable of producing that amount during their lifetime to break even. So that there is no possibility of avoiding a reduction in crude-oil reserves during 1942.

Completions again fell below the 300 level, formerly considered a minimum for an active week. There were four more oil wells and two more gas wells, but seven fewer dry holes, resulting in a decline of one completion from last week's low level. Activity is well under half of that of the corresponding week of last year although the declines are not uniformly distributed. Oil well completions are little more than 1/3 as numerous as during the corresponding week of 1941, gas wells are about 60 per cent as numerous and dry holes are now being drilled at about 2/3 of last November's rate. The lack of important discoveries makes any upturn improbable unless regulations are further relaxed. It must be pointed out, however, that the shot in the arm given to Illinois by amendment 5 to M-68 did little in the way of decelerating the production decline

OKLAHOMA: Discoveries are reported in the Wilcox east of North Shawnee and in the Viola in the North St. Louis district. A new gas field has been found in the Gilcrease in Okfuskee County. (p. 75).

ILLINOIS: A new pool has been opened east of the Jeff pool in Wayne County. It may be producing from either the McClosky or St. Louis lime. A wildcat southwest of Johnsonville has shown oil in the Aux Vases and Levias. It is being carried to the McClosky. Cypress saturation is reported in a Richland County test. (p. 72).

NORTH TEXAS: A new Strawn field is in prospect in Archer County. Wise County's first producer is a 205-bbl. pumper in the Bend conglomerate. A small Mississippi-lime discovery was gaged southwest of Henrietta in Clay County and an eastern Young County wildcat is showing oil in the Caddo lime. (p. 81).

WYOMING: The new deep pay at Elk Basin may extend well beyond the limits of the upper pays. The Sherrard gas field is extended ½ mile. Saturation has been found in a second Tensleep zone at Pilot Butte. (p. 70).

CALIFORNIA: The East Strand discovery, California's fourth for the year, promises to bring in a better field than the original Strand pool. Aliso Canyon may prove a major field since the Tide Water-Standard west extension well in the lower pay is an exceptionally good one for the field. After the first three wells had limited production in three directions, the fourth Turnbull Canyon well suggests further development to the west. (p. 70).

MICHIGAN: Considerable drilling activity is promised for the Osceola pool. (p. 79).

SOUTHWEST TEXAS: Gas fields have been opened in Goliad and Victoria counties with another wildcat testing distillate and gas in Refugio County. (p. 76).

WEST TEXAS: Field-development drilling is taking a slight upturn and several important wildcat tests have been staked. (p. 73).

TEXAS GULF COAST: Ohio Oil Co's Austin County Wilcox sand discovery is still testing. (p. 71).

EAST TEXAS: Wood County's second Paluxy field is yielding high-gravity crude and the pool promises to be drilled rapidly. (p. 78).

NORTH LOUISIANA: A new pool has been opened in the Pettit lime in Bossier Parish, 3 miles north of the old Carterville shallow pool.

MISSOURI: The wildcat well reporting a show in the Bartlesville in Atchison County is not yet completed. (p. 83).

KANSAS: Small producers have opened the Dunn's Mill and Stucky pools in Butler and Harvey counties. (p. 83).

COMPLETIONS IN ALL FIELDS . . .

(Week Ended December 5, 1942)

	Oil	Gas	Dry	Total	Footage	Td. comp. to date 1942	Td. comp. to date 1941
N. Y. Pa., and W. Va.	43	11	4	58	111,775	3,306	5,590
Ohio	3	12	3	18	49,284	1,078	1,608
Indiana	1	0	3	4	4,957	334	480
Kentucky	8	0	4	12	25,885	245	620
Illinois	17	0	12	29	73,885	1,764	3,446
Michigan	2	0	5	7	18,117	653	966
Kansas	9	5	14	28	79,616	1,468	2,003
Nebraska	0	0	0	0	0	33	76
Missouri, Iowa	0	0	0	0	0	13	37
Oklahoma	16	3	11	30	105,895	1,107	1,759
Texas:							
North Central Texas	4	2	3	9	13,520	1,017	2,665
West Texas	8	0	0	8	33,552	1,229	2,155
Texas Panhandle	0	1	0	1	3,320	329	654
Eastern Texas	5	0	4	9	46,935	380	977
Texas Gulf Coast	6	2	9	17	110,096	654	1,014
Southwest Texas	5	1	9	15	82,633	991	1,743
Total Texas	28	6	25	59	290,056	4,600	9,208
North Louisiana	6	0	2	8	32,781	467	730
Louisiana Gulf Coast	6	0	5	11	86,890	446	804
Total Louisiana	12	0	7	19	119,671	913	1,534
Arkansas	1	0	2	3	15,136	174	189
Mississippi and Southeast	0	0	3	3	7,014	73	264
Montana	3	0	0	3	8,814	191	273
Wyoming	2	1	0	3	13,237	107	173
Colorado, Utah	0	0	0	0	0	23	30
New Mexico	0	0	1	1	5,658	244	265
California	17	0	1	18	50,692	732	1,055
Total United States	162	38	95	295	979,692	17,058	29,476
Total previous week	158	36	102	296			
Week ended Dec. 6, 1941	460	65	134	659			

CALIFORNIA FIELD REPORT

Wildcat East of Strand Field May Open New Oil Pool

By L. P. STOCKMAN

LOS ANGELES, Calif. — Tide Water Associated Oil Co. appears to have discovered a new oil field about 1 mile east of the Strand field in Kern County and if subsequent developments prove this to be the case it will be known as the East Strand field and the original Strand field will be designated as West Strand. Associated's new well in 8-30s-26e is 56-8 Kern County Land and it came in flowing 1,992 bbl. of clean 31.9-gravity oil and 1,000,000 cu. ft. of gas daily from 8,207 ft. The interval open is at 8,100-8,207 ft. and the well was brought in barefoot, there being no liner or pipe below the shoe of the 7-in. water string cemented at 8,100 ft. The productive zone in this discovery well is believed to be a finger of the lower Stevens of Miocene age which has been found productive at Ten Section, Canal, Canfield Ranch and Strand. Tide Water Associated appears to have practically all of the potentially productive acreage under lease although Continental Oil Co. may possibly get into the play through ownership of a lease adjoining the Tide Water block. It is interesting to note that Tide Water Associated Oil Co. discovered the original Strand field by finishing a well on acreage that was acquired from Continental Oil Co. Only two operators, Shell Oil Co., Inc., and Tide Water, were able to develop commercial production at West Strand and accordingly drilling operations were along conservative lines. A similar policy will be followed in the development of East Strand where the acreage is large enough to eliminate any possibility of competitive drilling.

Drilling in Old Fields

The aggressive drilling program that started in several San Joaquin Valley fields continues and this week Shell began making locations for 25 more wells to be drilled in the East Coalinga field of Fresno County and Standard Oil Co. has new locations staked for nine additional wells. Most of this projected work will be done with portable drilling equipment and the new wells will have shallow zones as their objective. This aggressive development work in San Joaquin Valley fields is productive of comparatively small wells but operators feel if they can drill and complete enough of them the aggregate will prove to be an important addition to current production. It remains to be seen whether there will be enough casing available to finish all projected wells but one must remember that these 1,000-ft. wells do not require much pipe. For instance, the casing that would be required to complete a 10,000-ft. well would be more than enough to finish about 12 shallow wells. Many of the locations now being drilled up or scheduled for early work were included in the total contained in the report made several months ago by the California office of the OPC. The number to be drilled could be greatly enlarged if the price of heavy crude oil were high enough to justify the necessary expenditure by independent operators. The large companies are able to make the necessary expenditures due to their large cash balances, but the small operator who has been struggling along for the past 2 or 3 years on a consistently declining margin cannot proceed with new drilling. In addition to being unable to make the necessary outlay the independent operator is faced with higher drilling costs and must use less experienced men. Drilling companies may later be able to take up some of this slack, but operators holding undrilled acreage in San Joaquin Valley fields must sustain additional drilling out of current revenue. In addition to drilling some new wells, smaller operators would be able to rejuvenate many of the present number of producing wells that have not received a cleanout job for several years and thus increase current production. The added amount of production resulting from this reconditioning and rejuvenation work would not be large, but here again the aggregate total might prove relatively large. If 10,000 wells were increased only 1 bbl. per day it would mean an increase of 10,000 bbl. per day or 3,650,000 bbl. annually. It is this type of production that is at present required because these pumping wells do not make any appreciable amount of gas and right now the movement of natural gas is a problem due to inadequate transmission facilities.

SAN JOAQUIN VALLEY COMPLETIONS

Belridge, South, Kern County: Belridge Oil Co. 47-34 fee, 34-28s-21e, pumped 50 bbl., 15.9-gravity, 0.9 per cent cut, T.D. 765 ft., perf. 516-82 ft., 631-765 ft., completed in upper Belridge zone of Pliocene age.

General Petroleum Corp. 12-A Belridge 3-29s-21e, pumped 47 bbl., 13.4-gravity oil and 13 bbl. of water and sand, T.D. 960 ft., perf. 570-945 ft., completed in upper Belridge zone of Pliocene age.

General Petroleum Corp. 38 Belridge, 3-29s-21e, pumped 33 bbl., 13.6-gravity oil and 17 bbl. of water, T.D. 920 ft., perf. 485-676 ft., 725-900 ft., completed in upper Belridge zone of Pliocene age.

General Petroleum Corp., 39 Belridge, 3-29s-21e, pumped 48 bbl., 14-gravity oil and 12 bbl. of water, T.D. 960 ft., perf. 557-712 ft., 738-950 ft., completed in upper Belridge zone of Pliocene age.

Ohio Oil Co. 9 Emily Hopkins fee, 4-29s-21e, pumped 51 bbl., 13.5-gravity oil and 4 bbl. water, T.D. 865 ft., perf. 640-863 ft., completed in upper Belridge zone of Pliocene age.

Ohio Oil Co. 10 Emily Hopkins fee, 4-29s-21e, pumped 46 bbl., 13.6-gravity oil and 4 bbl. of water, T.D. 880 ft., perf. 646-878 ft., completed in upper Belridge zone of Pliocene age.

Coalinga, West, Fresno County: General Petroleum Corp. 105 Esperanza, 6-20s-15e, pumped 46 bbl., 13.5-gravity, 8 per cent cut, T.D. 2,016 ft., P.B. 1,943 ft., perf. 1,764-90 ft., 1,917-39 ft. completed in upper Coalinga zone of Pliocene age.

Kern Front, Kern County: General Petroleum Corp. 5 Wetmore, 14-28s-27e, pumped 10 bbl., 14.3-gravity, cut 80 per cent sand and mud, T.D. 2,045 ft., P.B. 1,920 ft., completed in Tegeler zone of Pliocene age, production will increase when cut is reduced.

Kettleman North Dome, Kings County: Kenda 341-12-P, 12-22s-17e, flowed 197 bbl., 42.6-gravity, 0.5 per cent cut, 5,000,000 cu. ft. gas, 38/64-in. bean, pressures 3,080/3,300 lb., T.D. 10,305 ft., brown shale 5,031 ft., bentonite 6,287 ft., Temblor 6,350 ft., completed in McAdams zone of Eocene age.

McKittrick, Kern County: Union Oil Co. 1-D Gamble, 6-30s-22e, pumped 9 bbl., 12.1-gravity, 75 per cent cut, T.D. 2,910 ft., P.B. 845 ft., perf. 620-840 ft., completed in upper zone of Pliocene age.

Midway-Sunset, Kern County: H. & T. Oil Co. 6 Midway-Sunset, 15-31s-22e, pumped 40 bbl., 12.8-gravity, 16 per cent cut, T.D. 2,842 ft., P.B. 920 ft., completed in upper zone of Pliocene age.

Richfield Oil Corp. 12 Southwestern. 2-31s-22e, abandoned in gray sand and shale, T.D. 1,310 ft., no showings of importance logged from top to bottom.

Standard Oil Co. 117-11-D fee, 11-32s-24e, pumped 30 bbl., 26.9-gravity oil and 11 bbl. water, T.D. 3,022 ft., perf. 2,961-3,022 ft., completed in second zone of Pliocene age.

Standard Oil Co. 103-15-D fee, 15-32s-24e, pumped 38 bbl., 30.5-gravity, 20 per cent cut, T.D. 2,884 ft., perf. 2,815-82 ft., completed in second zone of Pliocene age.

Strand, East, Kern County: Tide Water Associated Oil Co. 56-8 Kern County Land, 8-30s-26e, flowed 1,992 bbl., 31.2-gravity, 0.2 per cent cut, 1,000,000 cu. ft. gas, 28/64-in. bean, pressures 500/250 lb., T.D. 8,207 ft., N point 7,775 ft., completed in probable finger of lower Stevens zone of Miocene age, believed discovery well in new field located about 1 mile east of old Strand field, flowing barefoot.

Aliso Canyon Field

Tide Water Associated Oil Co. in a joint test with Standard Oil Co. extended the productive limits of the Aliso Canyon field ½ mile west this

(Continued on Page 92)

ROCKY MOUNTAIN AREA

Elk Basin Discovery Well Has Large Flow From Tensleep

By T. R. INGRAM

DENVER, Colo. — The Minnelusa Oil Corp. 1 E. T. Henderson, NE NE NE 31-58n-99w, Elk Basin field, Park County, Wyo., joint with the Yale Oil Corp., which opened a new black-oil field of major importance in the Big Horn basin, flowed 80 bbl. an hour pinched in. It did considerably better on open tests and fully comes up to the operator's expectations. The crude, cleaned up, tested 30° A.P.I. and is similar to the Frannie oil in the Tensleep except it has a better gasoline content. It is superior to Byron, Garland and Oregon Basin crude. Minnelusa and associated interests have between 600 to 700 acres in the field and will undertake additional drilling as soon as the development program is formulated. The discovery came at a time when there is a very good market for the black oils and R. S. Shannon, president of Minnelusa, says a number of inquiries from prospective purchasers already have been received. The operator's policy will be, he explained, to make more oil available as it is needed, especially to independent refiners in the territory.

An interesting sidelight on the discovery is the verification of Mr. Shannon's faith in the ultimate possibilities of lower horizons at Elk Basin. Although the field was discovered 30 years ago and has produced large quantities of oil from the Frontier sands at around 1,300 to 1,500 ft., this is the first test drilled to the Tensleep, a sand that is productive in practically all the developed fields in the basin. The fact that the well is in a lower fault block at the south end of the field makes it probable the productive horizon will cover a large area and extend far out beyond the boundaries of the upper sands.

Sinclair-Wyoming 2 Mary Carter, a 4,000,000-ft. gas well in the Sherrard field, Carbon County, Wyoming, extends the developed area ½ mile east of the discovery, completed last year for 8,000,000 cu. ft. in the Lakota.

Saturation has been found in a lower member of the Tensleep horizon at Pilot Butte in Superior Oil Co. 2 Annie Hoffman, CEL NE SW 22-3n-1w, but its value has not yet been determined. At 6,660 ft. a drill-stem test was made with the packer set at 6,447 ft. It was open 1 hour and 27 minutes and after testing for 51 minutes it began flowing water. The top of the Tensleep was at 6,230 ft. and was saturated. After going through approximately 150 ft. of hard dry lime below the upper saturated section it encountered the showing of oil. This oil was found below the water line in No. 1 Stock. The well is ½ mile south of the nearest producer. Should it prove to be a well in the deeper horizon it will make the third discovery this year at Pilot Butte, the others being in the Embar and upper Tensleep.

The Ramsey Petroleum Corp. 1 Graham, Buckingham district, Weld County, northeastern Colorado, began spudding November 29 and contractor will make an effort to complete it this year. A record of 2,380 ft. in 24 hours was made in the

(Continued on Page 73)

LOUISIANA GULF COAST

Relief Well Being Drilled To Acadia Parish Discovery

By T. F. SMILEY

NEW ORLEANS, La.—Efforts of Union Sulphur to kill its wildcat discovery well, 1 J. P. Gueno, in the Branch area of Acadia Parish, had not been successful at the week closed. On a 24-hour gage the well flowed 1,121 bbl. of 51-gravity distillate and 68,800,000 cu. ft. of gas. The pressure on the drill pipe was 260 lb., on the 7-in. casing 320 lb., and on the 10¾-in. casing 400 lb. The operators are drilling a second hole, 2 J. P. Gueno, as a relief to the discovery.

C. & I. Production Co. acidized its wildcat test, 1 Sam Haas estate, 2-4s-1w, in Evangeline Parish, at the plugged-back depth, 9,054 ft., after which the well flowed 29.70 bbl. of oil in 5 hours, then died. Preparations to swab were begun. Three oil sands have been encountered. The two lower ones are in the Sparta-Wilcox and the third is the Haas sand.

Gulf 2 Delta Securities, in the Bayou Couba area of St. Charles Parish, swabbed 36 bbl. of fluid in 8 hours, 85 per cent oil and 16 per cent wash water. It was shut in and preparations were begun to resume swabbing. The hole was drilled to 6,449 ft. in salt and plugged back to 6,235 ft.

William Helis 1 Armalise Planting Co., in the Napoleonville area of Assumption Parish, was drilling at 8,122 ft. An electrical log ran at 7,690 ft. produced on show of oil or gas.

Cores from 11,645 to 11,724 ft. in Gulf 1-H Amoskeag Savings Bank showed gas odor. Coring was resumed from 11,724 ft.

Magnolia 1 Farquhar Unit O-P, in Calcasieu, was waiting for cement to harden following a squeeze job at 6,554-57 ft. At a total depth of 8,178 ft. a test showed top sale at 8,160 ft., the first salt encountered in the field.

Jack W. Frazier was moving in rotary for a wildcat test, 1 Sweet Lake Oil & Land Co., in the Chalkley area of Cameron Parish. Other wildcats under way were Atlantic Refining Co. 1 Allen Land Co., 2 miles east of the Golden Meadow field in La Fourche Parish; Union Oil Co. of California 4-G Gray estate, Vinton field area, Calcasieu Parish; Humble 1 Panno & Bossetta, Inc., a quarter mile from St. James, in St. James Parish, to be an 11,500-ft. test.

LOUISIANA GULF COAST COMPLETIONS

Wildcats

Calcasieu Parish: Union Oil Co. of California 3-G J. G. Gray est., 33-10s-12w, 141 bbl. through ⅛-in. choke, T.P. 725 lb., C.P. 825 lb., gas-oil ratio (est.) 171, T.D. 5,360 ft., *discovery*.

La Fourche Parish; Amerada 9 Gheens Realty Co., 37-158s-20e, dry at 10,702 ft.

Fields

Bayou Sale, St. Mary Parish: Humble 4 Dave Luke, 17-16s-9e, 243 bbl. through ⅛-in. choke, T.P. 1,775 lb., C.P. sealed, gas-oil ratio 698, T.D. 10,480 ft.

Chacahoula, La Fourche Parish: Sun 1 J. B. Levert Land Co., Inc., 58-15s-15e, dry at 7,168 ft.

Delta Farms, La Fourche Parish: California Co. 1 Delta Farms, Inc. (originally drilled by Tide Water), 6-17s-23e, O.W.W.O., old T.D. 11,850 ft., old P.B. T.D. 11,307 ft., new P.B. T.D. 9,056 ft., 235 bbl. through ¼-in. choke, T.P. 1,525 lb., C.P. sealed, gas-oil ratio 710.

Eola, Avoyelles Parish: Amerada 1 Mrs. Felix S. Mouchan unit, 1-2s-2e, O.W.W.O., old T.D. 8,573 ft., old P.B. T.D. 8,571 ft., new P.B. T.D. 7,649 ft., 116 bbl. through ¼-in. choke, T.P. 900 lb., C.P. sealed, gas-oil ratio 1,649.

Garden Island, Plaquemines Parish: Texas 58 State-Garden Island Bay, 108-23s-32e, 97 bbl. through 1-in. choke, T.P. 460 lb., C.P. sealed, gas-oil ratio 650, T.D. 7,000 ft.

Golden Meadow, La Fourche Parish: Texas 25 L. L. & E.-Golden Meadow, 75-19s-20e, dry at 2,205 ft.

Lake Chicot, St. Martin Parish: Amerada and Phillips 1 Schwing Lumber & Shingle Co., 31-7s-10e, 198 bbl. through ⅛-in. choke, T.D. 1,150 lb., C.P. sealed, gas-oil ratio 249, T.D. 8,252 ft., P.B. 7,737 ft.

Pine Prairie, Evangeline Parish: Gulf 1 Thomas Schlicher, 36-3s-1w, junked and abandoned at 7,318 ft.

(Continued on Page 74)

TEXAS GULF COAST

Austin County Wilcox Sand Discovery Still Testing

By T. F. SMILEY

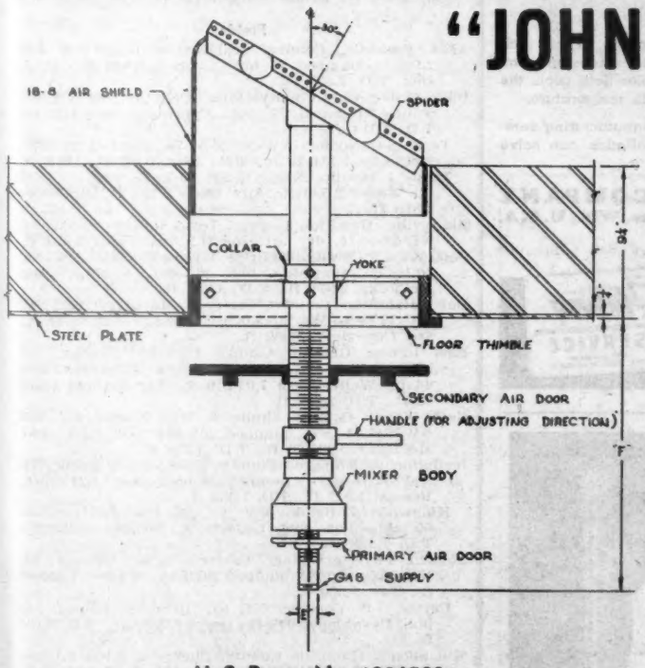
HOUSTON, Texas.—Ohio Oil Co. is continuing to test its wildcat, I Roy Kaechele, which is opening a new Wilcox sand field in the V. Flores Survey of Austin County. At 10,110 ft. the well flowed at the rate of 132 bbl. a day, with 27 bbl. of brackish water through ½-in. choke. Tubing pressure was 1,585 lb., casing pressure 2,400, shut in, and gas-oil ratio 76,591. At the same depth, using ¼-in. choke, the well flowed 99 bbl. of oil, 8 bbl. of brackish water, and 3,778,000 cu. ft. of gas. Tubing pressure was 2,750 lb., casing pressure 3,075, shut in, and gas-oil ratio 38,500.

Increased interest attaches to Humble's Brazoria County wildcat, 1-B Houston Farm Development Co., with the report that the hole may be carried to 14,000 ft., making it the deepest test east of the Rockies. The well, on a 5,000-acre tract in the Perry & Austin Survey, Halls Bayou area, is already below the original contract depth of 11,500 ft. It is about a mile and a half southwest of Starke Petroleum 1 Lena Griffith, which was abandoned at 10,410 ft. on account of mechanical difficulties after flowing oil, gas, and distillate.

Broderick & Gordon were preparing to run an electrical log in 1 L. G. Lobit, David Middleton Survey, in Harris County, a mile northwest of Addicks. This test, which has reached 7,516 ft., topped the Cockfield at 6,803 ft., Discorbis Yeguaensis at 7,005 ft. and Gyrodina at 7,095 ft.

Cities Service 1 F. Stephens, in the P. K. Bartle-

(Continued on Page 82)



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ILLINOIS FIELD REPORT

New Wayne County Field Opened East of Jeff Pool

MATTOON, Ill. — The Deep Rock Oil Co. has opened another oil pool in Wayne County in the area about 1½ miles east of the Jeff pool and about 6 miles north of Fairfield. Casing was set in the 1 S. L. Cantley, receiver, 7-1s-7e, at 3,134 ft. and the well was deepened to a depth of 3,281 ft. before oil entered the hole in commercial quantities. The hole filled 1,500 ft. with oil in 1 hour from the pay zone at 3,281-83 ft. Operators watching the area state that it could be producing from the St. Louis lime or the lower McClosky lime. The well is now shut in while storage tanks are being erected on the lease.

Another interesting test in the same county is Pure Oil Co. 1 Spicer, SE SW 8-1s-6e, 1½ miles southwest of the Johnsonville pool. Operators are drilling ahead after making a successful drill-stem test of the Aux Vases sand at 3,009-36 ft. which showed a recovery of 2,630 ft. of oil and 240 ft. of oil-cut mud in 1 hour. Another drill-stem test was made on the Levias, a sandy limestone at 3,075-95 ft., and showed recovery of 480 ft. of oil and 120 ft. of oil-cut mud in 45 minutes. The well will be carried on to the McClosky before completion.

The Roy Lee, trustee, 1 Hopkins Community, 27-3s-4e, about 1½ miles northwest of Bell Rive, is making a drill-stem test of the McClosky lime at 3,079-89 ft. after coring and recovering 2 ft. of porous oolitic lime with a show of oil. The test is about 6 miles from other oil production.

Only mud with no sign of oil saturation was recovered last week when plug was drilled to the Trenton lime at the Sohio 1 Ina M. Twiss, NE SW NE 23-2n-5w. The test, in an unproductive area a short distance west of Aviston, is now shut down on orders and it is probable that the well will be abandoned, although operators have not yet made a statement. The 1 Twiss has been closely watched for the past 3 months and at times it was thought the well would make a producer.

Another disappointment in Bond County was recorded during the past week with the abandonment of W. C. McBride 1 A. M. Keith, NW 30-4n-2w, a north extension attempt to the Follet field about 5 miles west of Keysport. The well was abandoned in the Aux Vases at a total depth of 1,240 ft. This formation is reported to have carried a show of oil but there was too much water for commercial production.

A new sand field is in prospect in northeast Noble Township of Richland County where Pure Oil Co. 1 Berger Consol., SE SW 26-4n-9e, has casing set to Cypress saturation. Operators reported good saturation in this formation and were to make a test during the week end. Total depth of the well is 2,588 ft.

ILLINOIS COMPLETIONS

Wildcats

Clinton County: Olson Oil 1 Alberterust, SW NE NW 29-2n-4w, dry at 3,250 ft., Devonian 2,283 ft., Trenton 3,105 ft.

Franklin County: Gilmore & Eslick 1 Hudson-Jones, SE SW NW 18-5s-2e, dry at 2,756 ft., Aux Vases 2,735 ft., show oil 2,735-50 ft.

Gallatin County: Phillips 1 Timber, NE NE NW 21-8s-10e, dry at 2,915 ft., Aux Vases 2,708 ft., McClosky 2,833 ft.

Marion County: A. J. Hammer 1-C Adams, NW NW NE 8-3n-1e, dry at 1,726 ft., Aux Vases 1,545 ft., McClosky 1,651 ft.

St. Clair County: Prichard et al 1 Holliday, SE NE NW 31-2n-7w, dry at 2,450 ft., Devonian 1,479 ft., Trenton 1,920 ft.

Wabash County: W. E. Ballor 1 Bearnone, SE NW SE 27-1n-13w, dry at 1,786 ft., no sand.

Central Pet. 1 Liddle, NW NW SW 26-1n-13w, dry at 2,490 ft., Benoist sand 2,478 ft.

Fields

Akin, Franklin, County: Seaboard 6 Coal, NW NE 23-6s-4e, pumped 68 bbl., Cypress 2,833 ft., 15-qt. shot, T.D. 2,839 ft.

Bible Grove, Clay County: Pure 3 Klutho, SE NW SE 4-5n-7e, pumped 17 bbl., Cypress 2,494-2,512 ft., T.D. 2,514 ft.

Texas 5-C Nodler, NW SE 5-5n-7e, pumped 18 bbl., McClosky 2,810-12 ft., T.D. 2,884 ft., P.B. 2,818 ft.

Texas 1 Hardin, NW NE SE 20-5n-7e, dry at 2,882 ft., Weiler 2,539 ft., Aux Vases 2,723 ft., McClosky 2,819 ft.

Blairsville, Hamilton County: Texas 5 Minton, SW SE NE 20-4s-7e, dry at 3,458 ft., Aux Vases 3,282 ft.

Coil, Wayne County: McBride 1 Gregory, NW NW NE 30-1s-5e, pumped 4 bbl. oil and 11 bbl. water, McClosky 2,971 ft., T.D. 3,055 ft.

Dale, Hamilton County: Carter 2 Mayberry, SE NW SW 12-6s-6e, dry at 3,079 ft., Aux Vases 3,042 ft., Ste. Genevieve 3,069 ft.

East Inman, Gallatin County: Carter 1 Busiek, SW NW SE 11-8s-10e, pumped 154 bbl., Palestine 1,820-44 ft., Waltersburg 1,046-59 ft., Tar Springs 2,036-42 ft., T.D. 2,057 ft.

Geff, Wayne County: Shulte & Wix 2 Atkinson, SW NW SE 11-1s-7e, pumped 265 bbl., 5,000 gal. acid, McClosky 3,234-39 ft., T.D. 3,250 ft.

Irvington, Washington County: Kingwood 8 Brink, NE NE SE 15-1s-1w, pumped 24 bbl., shot 1,521-26 ft., Benoist 1,517 ft., T.D. 1,532 ft.

Kingwood 7 Brink, NW NE SE 15-1s-1w, pumped 60 bbl., 5-qt. shot 1,534-37 ft., Benoist 1,530 ft., T.D. 1,538 ft.

Louden, Fayette County: Carter 7-E Rhedemeyer, SE NE SW 3-8n-3e, pumped 96 bbl., Weiler 1,491-97 ft., T.D. 1,500 ft.

Carter 7-D Fortner, NE SE 10-8n-3e, flowed 150 bbl., Devonian 3,045 ft., pay 3,133-35 ft., T.D. 3,135 ft.

Mill Shoals, Hamilton County: Cherry & Kidd 3 Gardner, W½ SE NE 24-3s-7e, swabbed 65 bbl., Aux Vases 3,241 ft., 20-qt. shot 3,242-52 ft., T.D. 3,253 ft.

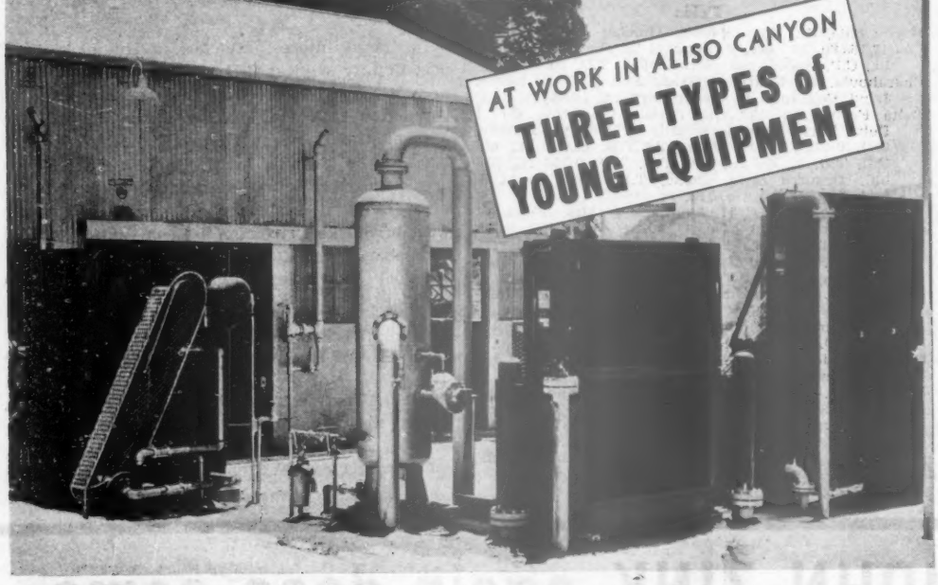
New Harmony, White County: Tide Water 13 Bacon, SE SW NE 5-5s-14w, pumped 33 bbl., 90-qt. shot 2,855-79 ft., pay 2,622-56 ft., T.D. 2,880 ft.

New Haven, White County: Hiawatha Oil & Gas 10 Stenson, SW NW NE 19-7s-11e, pumped 52 bbl., 60-qt. shot 2,717 ft., 320-qt. shot 2,716 ft., Aux Vases 2,717 ft., T.D. 2,900 ft.

Phillipstown, White County: Jarvis & Marcell 3 Gainer, SE SE NW 31-4s-11e, pumped 180 bbl., natural, Tar Springs sand 2,300-07 ft., 2,320-38 ft., T.D. 2,338 ft.

Roland, White County: Cities Service 7 John Mount,

(Continued on Page 74)



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Field Development Increasing And New Wildcats Staked

By W. D. THORN

MIDLAND, Tex.—West Texas wildcat activity showed no decline last week, while a slight boost in field drilling was indicated by a total of 25 new locations reported in the district for the week.

Barnsdall Oil Co. staked location for 1 H. D. Heath, in NE NE Section 315, Gibson Survey, 6 miles northeast of Plains in northeastern Yoakum County. It will be contracted to 7,500 ft., which is about 2,000 ft. below average depth in the area. Another location of unusual interest in the northern part of the West Texas basin was J. C. Hawkins 57-A Mallett, NW NW Labor 12, League 47, Edwards C.S.L. Survey, on the north edge of the Slaughter field, Hockley County. It will go to 6,500 ft., looking for deeper pays below the field's regular 5,000-ft. zone.

Adding to widespread exploration already under way in the southern portion of the basin, Moore Brothers, of Midland, Tex., last week announced locations for three Crockett County wildcats, one of which will be a 7,500-ft Ordovician operation. It is 1 J. S. Todd estate, 5 miles west of the Todd field, and in SW SW Section 16, Block YZ, E.L.&R.R. Survey. The other two locations, both contracted to 2,500 ft., were staked several miles north of the deep wildcat, 1 Shannon, in SW SW Section 21, Block YZ, and 2 Shannon, in NW NW Section 12, Block Q, John Small Survey.

Atlantic Refining Co. et al 1-A Tex-U, Andrews County deep wildcat, has been abandoned dry at total depth 10,760 ft., bottomed in Ellenburger lime. Elsewhere in the county, favorable developments were recorded. Fullerton Oil Co. 1 McKean and Eilers, east edge of the 7,200-ft. Fullerton field, flowed 40 bbl. of oil in 1 hour after treating the lower Permian lime zone with acid, and in the Embar-Ordovician field, Phillips Petroleum Co. was assured a prolific Ellenburger producer at 31 University-Andrews, which flowed 100 bbl. per hour on a drill-stem test from 7,760-7,885 ft.

Phillips Petroleum 1 Price, south central Pecos County wildcat, was drilling at 7,744 ft. in shale. Magnolia 1 Alan Robertson, northwest of Fort Stockton, started deepening from old depth of 6,561 ft., where negative production tests were made, and was drilling below 6,575 ft. in hard dry sand.

Shell Oil 1 Leaverton, Gaines County, was drilling at 7,531 ft. A core from 7,490-7,505 ft. returned 7 ft. of slightly porous lime with some staining. Shell Oil 1 Blue, Winkler County, was drilling at 7,785 ft. in lime.

Magnolia 1 Tucker, southern Crane County, was drilling at 6,430 ft., having logged only a slight oil show in the Simpson section around 6,200 ft.

Humble Oil 1 Newman, Scurry County, was drilling at 8,156 ft. in chert with no shows reported. Col-Tex et al 1 Wilson, same county, was drilling at 2,943 ft.

WEST TEXAS COMPLETIONS

Fields

Sun-Shannon, Crockett County: Olson Oil Co. 1-A Shannon Est., NW NW SW 800-ac. of Lge. 1, Archer C.S.L. Sur., elev. 2,528 ft., pumped 99 bbl., gravity 19.8, top Yates 1,135 ft., pay 2,063 ft., T.D. 2,068 ft.

Noelke, Crockett County: T. P. Coal & Oil Co. 1 fee, approx. SW NW Sec. 27, Blk. GG, M. T. Willon Sur., N edge field, elev. 2,812 ft., flowed 216 bbl. through tubing, natural, pay 1,526 ft., T.D. 1,560 ft.

Slaughter, Cochran County: Devonian Oil Co. 14-A Duggan, SW SW Lab. 2, Lge. 55, Oldham C.S.L. Sur., elev. 3,683 ft., flowed 1,018 bbl., pay 4,970 ft., acid 12,000 gal., T.D. 5,025 ft.

Slaughter, Hockley County: J. C. Hawkins 11-A Mallet, SW SW Lab. 23, Lge. 47, Edwards C.S.L. Sur., flowed 1,096 bbl., pay 4,929 ft., acid 11,500 gal., T.D. 4,980 ft.

L. M. Glasco (was carried J. C. Hawkins) 1-C Mallet, NW NW Lab. 22, Lge. 47, Edwards C.S.L. Sur., elev. 3,609 ft., flowed 926 bbl., pay 4,932 ft., acid 12,000 gal., T.D. 4,977 ft.

L. M. Glasco 4-C Mallet, SE SE Lab. 24, Lge. 48, Edwards C.S.L. Sur., elev. 3-614 ft., flowed 809 bbl., pay 4,940 ft., acid 15,000 gal., T.D. 4,993 ft.

(Continued on Page 80)

Rocky Mountain Area

(Continued from Page 70)

Colorado Associated well in that general area in 1932. However, progress is slowed up with depth after reaching the Timpas.

WYOMING COMPLETIONS

Elk Basin, Park County: Minnelusa Oil Corp. E. T. Henderson, NE NE NE 31-58n-99w, T.D. 4,547 ft., 5-in. 4,497 ft., saturation in Embar, top 4,463 ft., not tested. Tensleep 4,448-,538 ft., flowed 80 bbl. an hr.,

Horse Creek, Laramie County: General Petroleum Corp. 78-31-G, SW SE SE 31-17n-68w, T.D. 5,530 ft., 7-in. 5,444 ft., pumped 580 bbl. in 24 hr. initial 20 per cent b.s. and w. from Lakota sand, top Niobrara 4,210 ft., Muddy sand 5,265 ft., Dakota 5,419 ft., Lakota 5,451 ft., Morrison shale 5,515 ft. Elevation 6,780 ft.

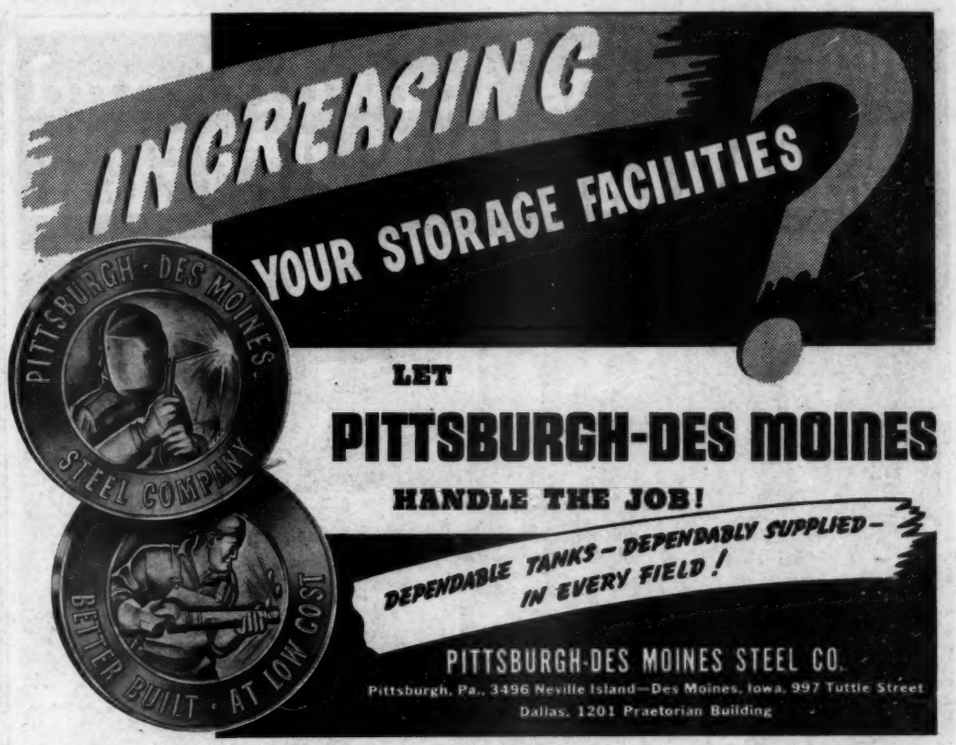
Sherrard, Carbon County: Sinclair-Wyoming Oil Co. 2 Mary Carter, NE SE SW 32-25n-88w, T.D. 3,160 ft., 7-in. 2,995 ft., top Dakota 2,898 ft., top Lakota 2,998 ft., 4,000,000 cu. ft. gas per day.

MONTANA COMPLETIONS

Cut Bank, Glacier County: Trigood Oil Co. 1 Tribal-230, SE NW SW 29-32n-5w, T.D. 2,835 ft., 7-in. 2,795 ft., Sunburst dry at 2,771-80 ft., Cut Bank 2,788-2,831 ft., main pay 2,800-31 ft., swabbed 500 bbl. in 18 hr.

Trigood Oil Co. 1 Tribal-232, SE NW SE 30-32n-6w, T.D. 2,967 ft., 7-in. 2,933 ft., Cut Bank 2,915-63 ft., main pay 2,940-63 ft., swabbed 230 bbl. first 6 hr.

Trigood Oil Co. 1 Tribal-231, SE NE SW 30-32n-5w, T.D. 3,012 ft., 7-in. 2,962 ft., no Sunburst sand, Cut Bank 2,962-3,009 ft., main pay 2,990-3,009 ft., swabbed 75 bbl. first 12 hr.



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THE OIL AND GAS JOURNAL

APPALACHIAN FIELDS

Good Gasser Completed in Young Township, Pennsylvania

PITTSBURGH, Pa.—In Southwest Pennsylvania there was a large shallow gas well but again no report of oil wells. In West Virginia, two deep wildcats proved dry, still further limiting Oriskany production, and one small oil well was completed. Completions for the past week in the lower eastern fields were retarded by continuous bad weather.

SOUTHWEST PENNSYLVANIA

In Slippery Rock Township, Lawrence County, the test of T. W. Phillips Gas & Oil Co., drilling to the Clinton sand on the Delilah Hill farm, was below 5,822 ft. and caving. The Newburg horizon is expected within the next 200 ft.

On Chestnut Ridge in South Union Township, Fayette County, New Penn Development Co., William E. Snee, et al, were drilling at 5,070 ft. in 2 Indian Creek Coal Co. Peoples Natural Gas Co. 1 Walters was drilling at 6,061 ft.

On Laurel Ridge in Ligonier Township, Westmoreland County, New Penn Development Co., William E. Snee, et al, reached 7,145 ft. in the test on the John and Eleanor Beck farm and were delayed by snow and roads. In Maryland, William E. Snee et al reached 5,032 ft. in old 1 Speicher on the Accident dome in Garrett County and is believed to be on bottom of the old hole although the former record shows a total depth of 5,160 ft. This discrepancy is possibly due to the old measurements being in error.

SOUTHWEST PENNSYLVANIA COMPLETIONS

Armstrong County, Mahoning Township: Charles Rough 1 John Stockdill, 100,000 cu. ft. gas, Murraysville, T.D. 1,050 ft.

Greene County, Jackson Township: Manufacturers Light & Heat Co. 1 Belle Grinnage, drilled deeper, started 3,096 ft. through Elizabeth, no added gas, T.D. 3,447 ft.

Washington Township: Manufacturers Light & Heat Co. 5 D. S. Garner, 1,200,000 cu. ft. gas, Fifty-foot sand 2,765 ft., T.D. 2,773 ft.

Indiana County, Armstrong Township: Peoples 1 N. B. Bowman, dry, T.D. 3,850 ft.

Young Township: T. W. Phillips Gas & Oil Co. 1 Joseph Hart, 7,000,000 cu. ft. gas, Thirty-foot sand 1,967-84 ft., T.D.

Washington County, North Strabane Township: Carnegie 1 A. D. McClure, dry, T.D. 2,932 ft.

WEST VIRGINIA

Two tests to the Oriskany sand, both wildcats, proved dry and limited production possibilities in the deeper sands in West Virginia. In Meade district, Tyler County, the test of Benedum & Trees on the Pearl Broadwater farm topped the Corniferous lime at 6,037 ft., Oriskany at 6,252 ft. but the sand was void of any showing and contained no water. The thickness of the Oriskany sand was 59 ft. and it is now drilling in the Helderberg and after a few more feet will be abandoned and plugged.

In Union district, Mason County, Godfrey L. Cabot, Inc., drilled through the Oriskany sand in the test on the Daniel Matheny farm and it was also void of gas, oil or water. The Corniferous lime was topped at 4,179 ft., Oriskany 4,259-73 ft., with total depth at 4,287 ft.

In Spring district, Wirt County, Benedum & Trees were drilling at 5,485 ft. in the Corniferous lime in the test on the Park Smith farm and another week should place the test in the Oriskany sand.

WEST VIRGINIA COMPLETIONS

Boone County, Peytona district: Owens, Libby-Owens 647 Bull Creek Coal & Land Co., 103,000 cu. ft. gas, Big lime 999 ft., Injun 1,186 ft., Berea 1,656 ft., Corniferous lime 4,147 ft., T.D. 4,303 ft.

Clay County, Henry district: Virginian Gasoline & Oil Corp. 1328 Brown, Swann & Goshorn, 4 bbl. Injun sand 1,782 ft., Big lime 1,680 ft.

Gilmer County, Troy district: A. E. Ellis 2 Mira B. Hall, dry, Big Injun 1,775-1,840 ft., T.D. 1,912 ft.

Kanawha County, Big Sandy district: Falling Rock Producing Co. 87 fee, drilled deeper, 300,000 cu. ft. gas, Berea, T.D. 1,892 ft.

Logan County, Logan district: Boone County Coal Co. 30 fee, dry, through Berea, will acidize Big lime. T.D. 3,039 ft.

Putnam County, Curry district: G. H. Summerson 1 C. H. Zerkle, 33,000 cu. ft. gas, Berea, T.D. 2,125 ft.

(Continued on Page 80)

Louisiana Gulf Coast

(Continued from Page 71)

Pan American 2 Dorcille Guillory, 37-3s-1w, O.W.W.O., old T.D. 8,369 ft., old P.B. T.D. 8,345 ft., dry at 8,345 ft.

Pan American 3 Dorcille Guillory, 37-3s-1w, location abandoned.

Texas 3-B Le Danois Land & Stone Co., 35-3s-1w, 318 bbl. through 12/64-in. choke, T.P. 750 lb., C.P. sealed, gas-oil ratio 660, T.D. 9,500 ft.

Roanoke, Jefferson Davis Parish: Humble 8-B J. W. Devilbiss, 11-9s-4w, O.W.W.O., old T.D. 8,841 ft., new T.D. 8,775 ft., 32 bbl. distillate and 870,000 cu. ft. gas through ⅛-in. tubing choke, T.P. 2,800 lb., C.P. sealed, gas-oil ratio 22,188, well shut in.

Ville Platte, Evangeline Parish: Amerada 1 Leona O. Roberts, O.W.W.O., old T.D. 10,190 ft., old P.B. T.D. 10,162 ft., new P.B. T.D. 10,098 ft., 24 bbl. through 3/64-in. choke, T.P. 880 lb., C.P. sealed, gas-oil ratio 15,500.

West Cote Blanche, St. Mary Parish: Texas 14 State-West Cote Blanche Bay, Bay-15s-7e, 227 bbl. through 9/64-in. choke, T.D. 1,220 lb., C.P. sealed, gas-oil ratio 463, T.D. 10,560 ft.

Illinois Fields

(Continued from Page 72)

NE NW NW 12-7s-8e, pumped 80 bbl., 30-qt. shot 2,207-14 ft., Waltersburg 2,200 ft., T.D. 2,215 ft.

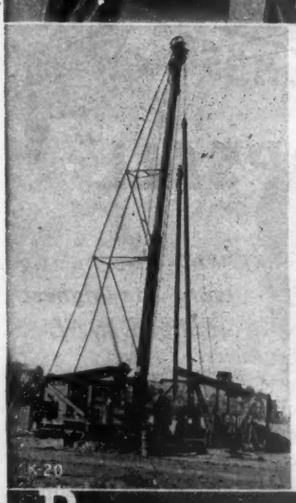
Rural Hill, Hamilton County: Shell 1 Cox, SE NE SE 12-6s-5e, pumped 36 bbl., 20-qt. shot 3,074-88 ft., 15-qt. shot 3,064-74 ft., T.D. 3,305 ft.

South Lawrence, Lawrence County: J. S. Young 2 Odnell & Seibert, N½ NE NE 26-2n-12w, pumped 40 bbl., Biehl 1,393-95 ft., T.D. 1,395 ft.

South Maunie, White County: Magnolia 18 Sisson-Higgins, SE SE SE 24-6s-10e, dry at 2,313 ft., Waltersburg 2,221 ft., Vienna 2,270 ft., Tar Springs 2,273 ft.

Magnolia 17 Higgins, SW SE SE 24-6s-10e, dry at 2,266 ft.

TWO speeds forward and INSTANTANEOUS REVERSE



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OKLAHOMA FIELD REPORT

Discoveries Reported in North Shawnee and North St. Louis Areas

By CARL HOOT

TWO new oil and one gas discovery marked a successful week in Oklahoma's operations. The total of 30 completions, comprising 16 oil, 3 gas, and 11 dry, is the highest since the first week in September in which there were 27 wells finished.

In northern Pottawatomie County, just east of the old North Shawnee Simpson sand pool, Atlantic, Stanolind, and Amerada 1 Whistler, NW SW SE 18-11n-5e, pumped initial potential of 285 bbl. of 32.5-gravity oil a day in the Wilcox at 4,835-53 ft. Cores taken in the sand showed good saturation after shooting, the well flowed 215 bbl. of oil in 18 hours.

In the North St. Louis district, also in Pottawatomie County, Cities Service 1 Goodin, NE SW 23-8n-4e, was classed as a Viola lime discovery when it pumped 50 bbl. of oil a day. Top of the lime was 4,290 ft., with Wilcox sand at 4,439 ft., and the second Wilcox at 4,533 ft. Drilled to total depth of 4,560 ft., the well was plugged back to 4,338 ft., acidized with 5,000 gal., and then swabbed 125 bbl. of oil and 400 bbl. of water in 40 hours. The water was cut to 45 bbl. with 58 bbl. of oil in 24 hours.

The gas discovery was Otha Grimes 1 Bailey, SE NW SW 19-8n-11e, 15 miles northeast of Holdenville and between the Yeater and Lamar pools of Hughes County. Pay was the Gilcrease sand topped at 2,869 ft., with the gas coming from 2,892-93 ft. The well gaged 14,000,000 cu. ft. a day at 950 lb. rock pressure.

General field activity reflected an increase. In Seminole County, northeast of the town of Wewoka, Sinclair Prairie 1 Jennings, S½ SW SE 8-8n-8e, flowed 135 bbl. of oil a day from Hunton at 3,909-39 ft. Drilled to 4,205 ft., perforations in the Hunton resulted in a flow of 38 bbl. in 19 hours but a 2,000-bbl. acid treatment augmented the flow to 272 bbl. in 14 hours, with gas estimated at nearly 4,000,000 cu. ft. Drilling here has been scattered but this location, as well as the pool south of the town is generally considered the Wewoka Townsite pool.

The McComb area of southern Pottawatomie County received one new wildcat test, while two others are drilling ahead. A mile northwest of the discovery well, 1 Hamil, Mid-Continent Petroleum spudded in its 1 Fromouth in SE SE 21-8n-3e. A mile and a half west and south, Continental and Kerlyn 1 Weaver, NW NE NE 32-8n-3e, was drilling below 3,900 ft.

OKLAHOMA COMPLETIONS

Wildcats

Hughes County: Otha Grimes 1 Bailey, SE NW SW 19-8n-11e, 14,000,000 cu. ft. gas, Gilcrease 2,892-93 ft.

Lincoln County: Murray & Portable Drlg. 1 Murray, NW SE 24-13-4e, dry, T.D. 5,125 ft., Bartlesville 4,208 ft., Hunton 4,880 ft., Viola 4,990 ft., Wilcox 5,076 ft., second Wilcox 5,117 ft.

Murray County: J. W. Dutton et al 1 Bristol, NW NW SW 9-1n-2e, dry, T.D. 3,512 ft., McLish 2,540 ft., Oil Creek 3,055 ft.

Pottawatomie County: Cities Service 1 Goodin, NE SW 23-8n-4e, pumped 50 bbl., Viola 4,283-4,338 ft., T.D. 4,560 ft.

Atlantic, Stanolind and Amerada 1 Whistler, NW SW SE 18-11n-5e, pumped 285 bbl., Wilcox 4,835-53 ft.

Seminole County: John Droppleman 1 Partridge, SE SE NE 4-11n-8e, dry, T.D. 3,690 ft., sand 2,765 ft., Cromwell 3,613 ft.

Fields

Big Pond, Creek County: J. E. Crosbie 1 Deer, NE SW 2-14n-7e, 4,750,000 cu. ft. gas, 750 lb. R.P., Bartlesville 3,082-3,106 ft.

Cumberland, Bryan County: Pure 2 Little-209, SE SE SW 27-5s-7e, flowed 143 bbl. in 4 hr., sand pay 5,608 ft., T.D. 5,710 ft.

Cushing, Payne County: Oklahoma Gaso. Plants 1 Palmer, NW SE 3-18n-6e, pumped 12 bbl., pay 3,332-58 ft., T.D. 3,362 ft.

Deer Creek, Grant County: Prunty Prod. 1 Lane, SE NE 22-27n-3w, flowed 30 bbl., Oswego 3,723-80 ft., T.D. 4,072 ft.

Edmond, Northeast, Oklahoma County: Harper-Turner 10 Harper, NE SE 17-14n-2w, swabbed and flowed, no gage, sand 5,815-61 ft.

Harper-Turner 12 Harper, NW NE 17-14n-2w, pumped 42 bbl., sand 5,871-5,901 ft.

Glenn Pool, Creek County: Gulf 26 Rhodes, W½ NW NW 21-17n-12e, pumped 16 bbl., sand 1,429-1,525 ft., T.D. 1,566 ft.

Gulf 30 Berryhill, NW SE SW 9-17n-12e, input well, T.D. 1,556 ft.

Gulf 28 Berryhill, SW SW 9-17n-12e, input well, T.D. 1,586 ft.

Lucien, North, Noble County: Danciger 2 Inselman, NW SE 5-20n-2w, pumped 25 bbl., Wilcox 5,384-94 ft., T.D. 5,506 ft.

Mounds, Okmulgee County: Kilingensmith 2 Powers, SE SW SE 1-16n-12e, 4,000,000 cu. ft. gas, Dutcher sand 2,186-2,201 ft., 300 lb. R.P.

Navina, Logan County: Cities Service 2 Babcock, SE NE 10-15n-4w, flowed 28 bbl., Layton 5,022-65 ft., T.D. 5,071 ft.

St. Louis, North, Pottawatomie County: S. K. Vierson 3 Duncan, NE SE 21-8n-4e, flowed 13 bbl., Hunton 4,019-28 ft.

Velma, Stephens County: Hollingsworth 2-A fee, NE SW SE 36-1s-5w, pumped 18 bbl., sand 714-826 ft., T.D. 834 ft.

Wewoka townsite district, Seminole County: Sinclair Prairie 1 Jennings, S½ SW SE 8-8n-8e, flowed 135 bbl., Hunton 3,909-39 ft., T.D. 4,205 ft.

Miscellaneous

Okfuskee County: Doak & Hughes 2 Hensley, NW NE NW 21-13n-9e, dry, T.D. 3,426 ft., Dutcher sand 3,181 ft., show gas.

Oklahoma County: Harper-Turner 1 Kunc, SE NE 32-14n-2w, pumped 30 bbl., sand 5,842-83 ft.

Osage County: Sinclair Prairie No. 64, SW NE NW 20-23n-12e, pumped 2 bbl., Bartlesville 1,628-1,721 ft., T.D. 1,728 ft.

Four States No. 6, NW NW SE 13-25n-10e, pumped 30 bbl., Oswego 1,483-1,512 ft., T.D. 1,516 ft.

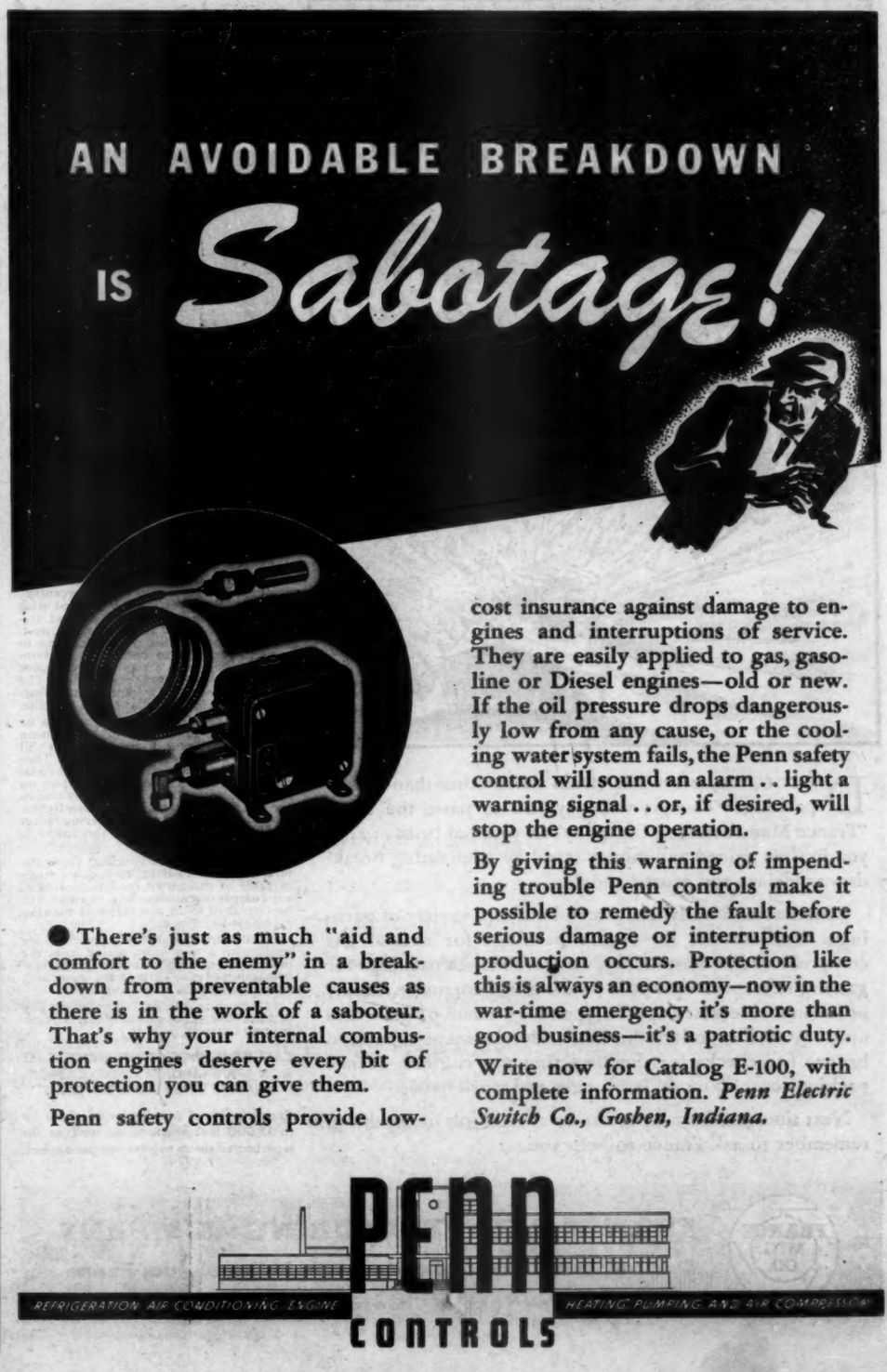
Payne County: Simon Lehow 1 Jones, NE SW SE 12-19n-4e, dry, T.D. 3,800 ft.

Seminole County: American Oils 1 Burton, NW NW 11-5n-5e, dry, T.D. 2,685 ft.

Tulsa County: Noah Harris 1 Harris, NW NE NW 9-18n-13e, dry, T.D. 2,219 ft., Arbuckle 2,185 ft.

A. Pepis 4-A Oswalt, NE SW 6-17n-13e, dry, T.D. 2,210 ft., Wilcox 2,203 ft.

Johnson Oil & Ref. 8 Bailey-Grimes, N½ NE SW 31-19n-10e, dry, T.D. 3,237 ft., Arbuckle 3,230 ft.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SOUTHWEST TEXAS

Gas Discoveries Reported in Goliad and Victoria Counties

By T. F. SMILEY

CORPUS CHRISTI, Tex.—Ginther, Warren & Ginther's wildcat, 1 C. G. and R. H. Wood, which has opened a new gas field in the D. Morris Survey, 9 miles southeast of Goliad, in Goliad County, was producing an estimated 180,000,000 cu. ft. of gas on open flow, as the week closed, along with 0.28 bbl. of distillate for each 1,000,000 cu. ft. of gas. Analysis of the gas is reported to have shown methane 98.15 per cent, ethane 1.60 per cent, propane 0.12 per cent, isobutane plus 0.13 per cent rated at 1,031 B.t.u. On ¼-in. choke the well showed pressure of 1,715 lb. and on 7/16-in. choke 1,680 lb. The shut-in pressure was 1,740 lb. The new field has been named Sarco.

Opening of another gas field was recorded by Union Producing Co.'s wildcat, 1 Peter Rydolph in the J. F. Kemper Survey of Victoria County. This well was producing 162,000,000 cu. ft. of gas through open tubing.

With casing perforated at 8,460-80 ft. Gulf 2 Virginia Tatton, a wildcat in the Essey Reed Survey, Refugio County, tested gas, distillate and wash water on ¼-in. choke, with 300 lb. working pressure on the tubing and the casing sealed off.

Following completion of their gasser in Goliad County, Ginther, Warren & Ginther are moving in material for another wildcat test in the same county. The new one is 2 Carrie G. and R. H. Wood, in the Pedro Villa Survey, 2 miles east of Sarco. Other wildcat tests getting under way in the lower Gulf Coast territory are Kirkwood & Morgan 1 Dee Daugherty, in the Jose Pachero grant, a mile northwest of Magnolia City, Jim Wells County; Sam E. Wilson, Jr., 1 Maria S. de Garza, Ramon de la Garza grant, Jim Wells County; R. H. Hawn Co. 1 W. Bauer, M. L. D. Herrera Survey, 1½ miles northeast of Robstown, Nueces County; Bridwell Oil Co. 1 J. C. and A. Wood, J. Sinnott Survey, 6 miles northwest of Refugio, Refugio County; Frank Buttram 1 F. and W. F. Cleveland, S. Edwards Survey, 3 miles southeast of Odem, San Patricio County.

The South Texas area rang up four dry wildcat tests during the week, with one dry field completion. No producers were recorded. The wildcat disappointments were those of the Sun, in Jim Hogg County; Highland Oil Co., in Duval County; Dulup Oil Co., in Zapata County, and two for Magnolia in La Salle County.

O. W. Killam was rigging up for a wildcat test, 1 Bruni estate, 6 miles east of Bruni, in Webb County. H. B. Friedman Co. 1 Thomas Ward will be a wildcat 1½ miles west of the Mirando Valley field in Zapata County.

Gulf 1 Nueces Land & Livestock Co., in the James McGrain Survey, McMullen County, topped the Carrizo at 5,487 ft. and was drilling ahead at 6,349 ft.

After going to a total depth of 7,648 ft. Humble's Atascosa wildcat test, 1 A. C. Soechting, in the Peter McGreal Survey, 1,880 ft. northeast of 1 Thompson, was completed as dry.

With perforations at 2,351-55 ft. J. Deering 1 Union Central Life Insurance Co., 4 miles south of Lockhart, in Caldwell County, was bailed and swabbed, recovering salt water and sulfur water, with no show. The hole was plugged back to 2,300 ft., with knife perforations at 2,196-2,246 ft.

W. Stewart Boyle, independent operator of Houston, was moving in material for a wildcat, 1 J. H. Harris, in the William Page Survey 2, midway between Dilworth and Waelder in northeast Gonzales County. Another wildcat test for the South Central Texas area is that of W. J. Walton et al 1 McKnight estate, 4 miles southwest of Carrizo Springs, in Dimmit County. It will be a shallow test.

SOUTH TEXAS COMPLETIONS

Wildcats

Duval County: Highland Oil Co. 1-B-1 de la Garza, Sur. 524, dry at 3,314 ft.

Jim Hogg County: Sun 2 Weil Bros., dry at 5,805 ft.

La Salle County: Magnolia 1 Burks ranch fee, Antonio Herrera Sur. 236, no shows in series of tests, dry at 6,202 ft.

L. V. Manry 1 R. L. Talbert, H.&G.N.R.R. Sur. 149, dry at 5,616 ft.

Zapata County: Dulup Oil Co. 1 Thomas H. Ward, Sur. 613, 1 mi. E of Blas Urbe field, location abandoned.

Fields

Boyle, Starr County: Fidelity Oil & Royalty Co. 2-D Sugarland Industries, dry at 4,110 ft.

SOUTH CENTRAL TEXAS COMPLETIONS

Wildcats

Atascosa County: Humble 1 A. C. Soechting, Peter McGreal Sur. 1293, A-623, dry at 7,648 ft.

Milam County: Boescher & Clarkson 1 H. H. Coffield, Henry Martin Sur., dry at 6,181 ft.

LOWER GULF COAST COMPLETIONS

Wildcats

Bee County J. W. Gorman and Scheig Bros. 1 Kubela, H.&G.N.R.R. Sur. 9, dry at 4,403 ft.

Smith & Storey 2 S. McNeil, Carmen Motina Sur. A-39, dry at 3,985 ft.

Goliad County: Ginther, Warren & Ginther 1 C. G. and R. H. Wood, D. Morris Sur., 9 mi. SE of Goliad, est. 180,000,000 cu. ft. gas open flow, distillate est. 0.28 bbl. per 1,000,000 cu. ft. gas, pressure on ¼-in. choke 1,715 lb., on 7/16-in. choke, 1,680 lb., S.I. pressure 1,750 lb., T.D. 5,270 ft., *discovery, changed from wildcat to Sarco field.*

Victoria County: Union Producing Co. 1 Pete Rydolph, J. F. Kemper Sur., 162,000,000 cu. ft. gas open flow, T.D. 5,892 ft., *discovery.*

Fields

Odem, San Patricio County: Seaboard 2-C James S. Welder, 110 bbl. through ⅛-in. choke, T.P. 650 lb., C.P. 1,300 lb., T.D. 5,463 ft.

Seaboard 3-A C. C. Parker, Juan Hart & Son Sur. A-10, 120 bbl. through ¼-in. choke, T.P. 675 lb., C.P. 1,375 lb., gas-oil ratio 300, T.D. 5,530 ft.

(Continued on Page 80)

DO YOU, too, get a "lift" from those other-than-France packings? Then it will pay you to paste the name "France Manufacturing Company" in your hat brim . . . pay you in time gained and money saved by eliminating breakdowns, delays and scored rods.

France scientifically designs and makes a variety of packings. Well known are France packings for natural gas compressors but outstanding, also, are France packings for gas engines, special purpose packings for corrosive, deadly or inflammable gases operating under vacuum or pressures up to 15,000 lbs., and another France development—sheathed bronze fire checks for double-acting gas engines. France packings cost no more, last longer and work better.

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Carbon-Bakelite Packing and Piston Rings give outstanding service in natural gas compressors. They have proved equally satisfactory in compressors for many other gases, notably propane, butane, methane, still gas and others of the hydro-carbon series. They are chemically immune to the effects of "sour" gas.

Carbon-Bakelite is a phenol-formaldehyde product containing a high percentage of fine carbon particles, laminated with duck and bonded under heat and tremendous pressure. It is a hard, dense, durable, non-metallic substance, light in weight, resistant to corrosion. Carbon-Bakelite possesses a very low coefficient of friction and strongly resists wear. The carbon content greatly improves the wearing and bearing qualities of the Bakelite.

Carbon-Bakelite, used for packing or piston rings, produces a high polish on the rod or cylinder. Rings made of it will out-wear metal rings in gas service. They wear especially well on sprayed-metal rods. The ring retaining grooves show no appreciable sign of wear. This is due to the fact that the rings, being much lighter than metal, cause no hammering effect on the groove walls when the stroke is reversed.

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Specification blanks for ordering any of the products above are available promptly upon request.

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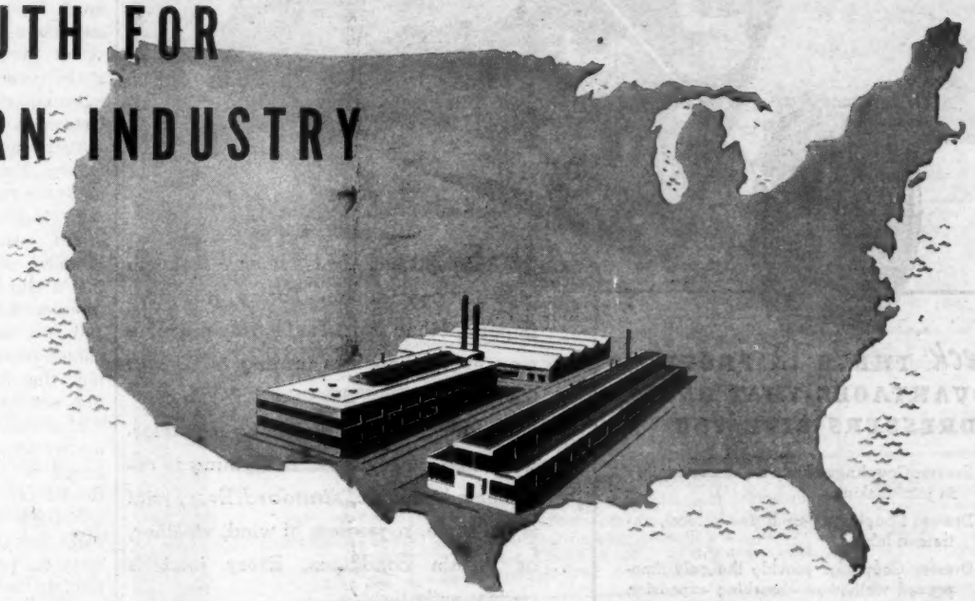

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The textile industry, the soap, chemical, oil refining, pulp and paper industries—in fact all Southern industries which use this universally useful chemical—will find these new production facilities advantageous.

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DRESSER PIPE COUPLINGS

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EASTERN TEXAS FIELDS

Wood County's Second Paluxy Sand Discovery Makes Good Gage

By W. D. THORN

DALLAS, Texas.—Successful completion of Wood County's second important Paluxy sand discovery of the year furnished the outstanding development last week in the East Texas district.

Delta Drilling Co., L. B. Benton et al 1 J. B. Goldsmith, Wood County wildcat northwest of Quitman, in the Purse Survey, flowed 181.5 bbl. of pipe-line oil in 6 hr. on Railroad Commission test, through ¼-in. choke, to establish 24-hour potential of 526 bbl. Tubing pressure was 595 lb., casing pressure 660 lb. Production was through casing perforations at 6,280-6,310 ft., opposite the entire body of saturated Paluxy sand found. It had topped the Paluxy formation at 6,258 feet, and hole was carried to total depth of 6,544 ft. The crude is a dark brown sweet oil, testing 43.0 gravity.

Crude produced in the Coke field, discovered earlier this year in northern Wood County, is of much lower gravity, checking about 26.0 gravity, and has a high sulfur content. Laboratory analysis of the Delta crude, necessary to determine if the crude is of a type suitable to meet one or more specific war needs, was not available late last week.

This new strike is located on acreage farmed out by Shell Oil Co., Inc. Some geologists estimate the field will cover about 2,000 acres. Shell, Sun, Magnolia, Humble, Amerada and a few others own leases within the area which may produce. A drilling campaign, conducted at as fast a clip as present regulations will permit, is foreseen for the area. Since the crude is sweet and the big lease owners are integrated companies, there seems little doubt that adequate pipe line facilities to handle the field's production will become available as necessary.

Magnolia 1 McCreight, wildcat about 4 miles northwest of the new producer, was drilling ahead at 5,730 ft., and was expected to reach the Paluxy zone, around 6,300 ft., early this week.

Nacogdoches County's deepest, Texas 1 Strahan, drew new attention last week. Bottomed at 9,016 ft., presumably in the Travis Peak formation, it made four unsuccessful attempts to test through drill stem, and subsequently resumed drilling, was drilling below 9,085 ft. at the close of last week.

Two Smackover lime projects in East Texas continued to make hole. In Bowie County, P. D. Bowlen et al 1 Simms was drilling at 8,021 ft., probably in or near top of the Buckner zone. In Ellis County, J. B. Stoddard et al 1 Smith was drilling below 3,920 ft., in the Travis Peak zone.

Important new 9,000 ft. wildcat location in extreme southeastern Franklin County was being staked by Tide Water-Seaboard at 1 Bacon, in the Maximillian Survey.

EAST TEXAS COMPLETIONS

Fields

Coke, Wood County: Amerada 2 Bessie Conner, B. Smith Sur., elev. 520 ft., flowed 88 bbl., 8 hr. through ¼-in. choke, perf. casing 6,350-60 ft., T.D. 6,370 ft.

Hawkins, Wood County: Humble Oil 3 L. A. Bryan Est., W. Parker Sur., flowed 245 bbl. through ¼-in. choke, perf. casing 4,724-44 ft. and 4,754-63 ft., elev. 424 ft., T.D. 4,834 ft.

Humble Oil 3-C L. A. Bryan, M. Esparcia Sur., elev. 424 ft., flowed 92 bbl. in 6 hr. through ¼-in. choke, perf. casing 4,835-50 ft. and 4,866-73 ft., T.D. 4,877 ft.

Humble Oil A-2 W. S. Shamburger, James McAnulty Sur., elev. 436 ft., flowed 254 bbl. in 18 hr. through ¼-in. choke, perf. casing 4,846-52 ft., 4,864-70 ft., T.D. 4,872 ft.

Wildcats

Anderson County: Shell Oil 1 E. H. Massey, F. Bettick Sur., Tennessee Colony prospect, elev. 390 ft., top

Woodbine water sand 4,832 ft., dry, T.D. 5,207 ft.

Freestone County: J. B. Daniels 1 W. G. Johnson, J. L. Bennett Sur., 2¼ mi. NE Streetman, dry, T.D. 3,835 ft.

Henderson County: Bobby Manziel B-1 Tena Levine, Jonathan Ping Sur., 2 mi. N Trinidad, elev. 315 ft., base Austin chalk 3,445 ft., dry, T.D. 3,950 ft water sand.

Shelby County: Humble Oil 1 R. C. Adams, W. Reynolds Sur., dry, T.D. 6,446 ft. lime.

Wood County: Delta Drilling Co. et al 1 J. B. Goldsmith, William Purse Sur., 4 mi. NW of Quitman, elev. 495 ft., flowed 181.5 bbl. in 6 hr. through ¼-in. choke, gas-oil ratio 316 to 1, T.P. 595 lb., C.P. 660 lb., pay 6,280-6,310 ft. through perf., crude dark brown sweet oil, 43 gravity, top Paluxy 6,258 ft., T.D. 6,544 ft., *discovery well.*

MICHIGAN OPERATIONS

Extensive Development Program Under Way in Two Counties

By OTTO C. PRESSPRICH

SAGINAW, Mich.—Sun Oil Co. has launched an extensive oil drilling program for Osceola Township of Osceola County and Norwich Township of Missaukee County, taking out 15 drilling permits in the past week. The state Conservation Department issued Sun eight permits for tests in Sections 21, 27 and 28 of Osceola Township, another for Section 15 of Evart-Osceola, five others for Sections 10 and 11 of Norwich, one for Section 27 of Beaverton-Gladwin.

From the standpoint of permits it was the biggest week of the year, a total of 27 for exploration in a dozen counties being granted. Other permits went as follows: Two each for locations in Clare, Gladwin and Lake counties, one each for Montcalm, Ottawa, Isabella, Bay, Allegan and Arenac. The activity jumped the year's permits total to 535.

Sun Oil Co. planned to reacidize its 3 Horner in Section 14, Norwich-Missaukee in hopes of getting a commercial producer from the hole which has been swabbing around 25 bbl. from the Dundee at 3,090 ft. Sun has drilled two small producers in the vicinity deeper into the Monroe. Sun also is testing its A-1 State, an Enterprise Township wildcat in Section 11, which has some oil shows, along with water.

Among the week's dry holes was Chartiers Oil Co. 1 Allen in Section 32, Pine River-Gratiot, second offset failure to the wildcat producer completed in the past summer. Another test is under consideration.

Prospects are for a further production decline from Michigan fields this month. The federal quota has been fixed at 63,800 bbl. a day but P. J. Hoffmaster, state supervisor of wells, said indications are that production will not exceed 62,000 bbl. a day. Mr. Hoffmaster said increasing gas-oil ratios in wells has forced many producers to cut back wells voluntarily to maintain efficient operation. The Oil Advisory Board is investigating a proposal to repressure Reed City field wells with casinghead gas. Mr. Hoffmaster said the opinion is that the plan would increase present production as well as ultimate recovery from the field.

MICHIGAN COMPLETIONS

Genesee County, Thetford Township: A. L. Williams 1 Totten, SW SE NE 11-9n-7e, wildcat test, dry, T.D. 2,130 ft.

Gratiot County, Pine River Township: Chartiers Oil Co. 1 Allen, NE SW NW 32-12n-3w, dry, T.D. 3,298 ft.

Mecosta County, Fork Township: Sun Oil Co. 1 Maynard, C S½ SW SW 5-16n-7w, 290 bbl., natural, T.D. 3,805 ft.

Osceola County, Osceola Township: Sun Oil Co. 1 Wilcox-Schoenhals communitized, C N½ NE NW 27-18n-8w, 227 bbl., natural, T.D. 3,746 ft.

Ottawa County, Wright Township: Smith Petroleum Co. 1 Kragt, C S½ SW NE 29-8n-13w, wildcat test, dry, T.D. 1,919 ft.

Zeeland Township: Bridger Basin Oil Co. 1 De Hoop & Grasman communitized, NW SW NE 2-5n-14w, wildcat test, dry, T.D. 1,669 ft.

Roscommon County, Roscommon Township: C. L. Maguire, Inc., D-1 State, SW SW SE 21-21n-4w, wildcat test, dry, T.D. 1,550 ft.

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	DO THIS ONCE EACH YEAR	WILL IT FREEZE?
CARBON DIOXIDE	Weigh to detect leakage. If extinguisher shows loss of weight of less than 10% of rated capacity, stamped on label, nothing need be done. Recharge if weight loss shows greater than 10%.	no
SODA ACID	Discharge and refill. Mix soda solution outside extinguisher, following manufacturer's instructions. Use lukewarm, not hot water. Wash all parts with water. Examine for clogging or corrosion.	yes Do not keep outdoors in cold weather.
PLAIN WATER	Inspect by removing and weighing carbon dioxide cartridge. Replace cartridge if weight loss exceeds ½ ounce. Inspect hose and nozzle for clogging or corrosion, and check the quantity of water.	See label for this information.
FOAM	Recharge. Mix solution outside the extinguisher according to manufacturer's exact directions. Wash all parts thoroughly with water. Test hose. Examine for corrosion or clogging.	yes Do not keep outdoors in cold.
VAPORIZING LIQUID	Test by partially discharging. Pump a few strokes with extinguisher first aimed upward and then downward. Replace lost liquid, as furnished by manufacturer.	no
DRY COMPOUND	Remove and weigh carbon dioxide cartridge. Replace if it shows loss of weight of more than ½ oz. for 12 lb. extinguisher or 1 oz. for the 20 lb. size. Check quantity of dry compound and determine that it is free-flowing.	no
CARBON DIOXIDE SYSTEM	Weigh cylinders to check loss of contents. Blow out carbon dioxide lines. Check all releases, thermostats, tubing, switches, pull boxes and electric lines.	no

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NOTE: Recharge extinguishers immediately after use, even though only partially expended.

OHIO, INDIANA, KENTUCKY

Big Clinton Sand Gasser In Clayton Oil Field

ZANESVILLE, Ohio.—The Pure Oil Co. drilled in a big gas well on an inside location in the Clayton oil field gaging 5,400,000 cu. ft. at 14 ft. in the Clinton sand. It has been turned in the line and will be completed when the gas volume has diminished. The well is the 8 James Pargeon in Section 7, Clayton Township, Perry County. The shallow gas field at Lottridge, Athens County, was extended to the west by a 1,000,000 cu. ft. well in the Macksburg 800-ft. sand on the Ray Wingett tract in Section 3, Lodi Township. The area produces from a number of sands ranging in depth from 700 ft. to 1,800 ft.

OHIO COMPLETIONS

Ashland County, Lake Township: Ohio Fuel 1 E. L. Butler, Sec. 23, Clinton, 242,000 cu. ft., T.D. 3,125 ft.
Frank Lyons 4 Chas. A. Moore, Sec. 15, Clinton, dry, T.D. 2,935 ft.
Athens County, Lodi Township: H. B. Walker 2 Ray Wingett, Sec. 3, Macksburg 800-ft. sand, 1,000,000 cu. ft., T.D. 1,018 ft.
Trimble Township: Preston Oil 220 Sunday Creek Coal Co., Sec. 36, Clinton, 30 bbl., T.D. 3,645 ft.
Coshocton County, Mill Creek Township: Bell Bros. 1 I. W. Bechtel, Sec. 2, Berea, 30,000 cu. ft., T.D. 905 ft.
Pike Township: Allen Willey et al 1 Jos. Lake, Sec. 19, Clinton 60 bbl., T.D. 3,321 ft.
Hocking County, Ward Township: Preston Oil 213 Sunday Creek Coal Co., Sec. 23, Clinton, 30 bbl., T.D. 3,465 ft.
Holmes County, Mechanic Township: Bell Bros. 1 Cath. A. Wolgamot, Sec. 8, Berea, 68,000 cu. ft., T.D. 777 ft.
Jefferson County, Saline Township: C. S. Kelley et al 2 Isaac Saltsman, Sec. 13, Berea, dry, T.D. 1,328 ft.
Licking County, Bowling Green Township: Midland O. & G. Co. 3 S. S. Cooperider, Sec. 3, Clinton, 262,000 cu. ft., T.D. 3,034 ft.
Eden Township: National Drlg. Co. 1 Frank Fischner, Clinton, 135,0$00 cu. ft., T.D. 2,815 ft.
Meigs County, Bedford Township: Ohio Fuel 1 L. M. Midkiff, Sec. 4, Berea, dry, T.D. 1,817 ft.
Rutland Township: Nolan Shuster 3 fee, Sec. 28, Maxon, 220,000 cu. ft., T.D. 947 ft.
Morgan County, York Township: Pure Oil 1 Clarence Williams, Sec. 26, Clinton, 400,000 cu ft., T.D. 4,284 ft.
Litton & Bradford 3 Frank Matheny, Sec. 22, Clinton, 175,000 cu. ft., T.D. 4,249 ft.
Muskingum County, Blue Rock Township: Industrial Gas Corp. 1 H. S. Barricklow, Sec. 9, Clinton, 719,000 cu. ft., T.D. 4,426 ft.
Perry Township: Wittmer Co. 1 G. W. Wilson heirs, 3d quarter, Clinton, 431,000 cu. ft., T.D. 4,170 ft.
Summit County, Boston Township: Wm. Dempsey 1 L. Mance, Lot 3, Newburg, 823,000 cu. ft., T.D. 3,023 ft.

INDIANA

EVANSVILE, Ind.—Roy Lee, trustee, 1 W. P. Dearing, located in 30-8s-13w, near the junction of the Wabash and Ohio rivers, is shut down on orders at a total depth of 2,625 ft. So far there has been no commercial saturation reported in the well and operators have not yet decided whether to plug the well or to drill ahead to deeper possible pay horizons.

McGinnis and Bitler are making a production test of the Hardinsburg sand at 1,323-33 ft. in their 1 Carithers, NW NE SW 26-1s-10w, about 4 miles northeast of Princeton in Gibson County, after a 60-qt. shot of nitro. The last available gage on the well showed a net production of 80 bbl. of oil in 12 hours before shot.

R. L. Craig has staked location for the 1 Louisa Mertens, SW SW SW 17-6s-12w, northeast of the Caborn field and about 8 miles west of Evansville. Other locations staked during the past week include the Central States Oil Co. 3 Hermson, SW SE NW 30-6s-12w, and the C. A. Lennan 2 A. Wolf, NE NE NE 19-6s-12w, in the Caborn field.

INDIANA COMPLETIONS

Daviess County: J. Hart 6 C. and E. Graves, NW NE NE 8-2n-5w, dry, T.D. 632 ft.
Jay County: Vicker Oil 1 Kellar, S½ NE SW 15-24n-14e, pumped 25 bbl., pay 1,016-25 ft., T.D.
Spencer County: O. F. Kelly 1 Wilkerson, NE NW NW 2-8s-7w, dry, T.D. 1,450 ft., Cypress 1,428 ft.
Vanderburg County: Sells Pet. 1 Schutte-Weber, SW

(Continued on Page 92)

Appalachian Fields

(Continued from Page 74)

Charles Gas Co. 1 Clarissa L. M. Harper, 152,000 cu. ft. gas, Berea, T.D. 2,270 ft.
Ritchie County, Murphy district: Pittsburgh Oil & Gas Co. 3 Fred Lemon, drilled deeper, 239,000 cu. ft. gas, Maxton sand 1,622 ft. with oil, Big lime 1,716 ft., injun 1,777-88 ft., T.D. 1,912 ft.

ORISKANY GAS FIELDS

Jackson County, Ripley district: Howard Bartlett 1 Sattis Simmins, dry, Corniferous lime 5,132 ft., Oriskany 5,240 ft. with 26,000 cu. ft. gas after shot, T.D. 5,298 ft.
Spartan Gas Co. 3 W. E. Walker, 5,512,000 cu. ft. gas, Oriskany 5,132-51 ft., T.D. 5,152 ft.

Southwest Texas Fields

(Continued from Page 76)

Shield, Nueces County: Shield Oil Co. 4-A J. O. Moore, 165 bbl. through ⅛-in. choke, T.P. 800 lb., C.P. 900 lb., T.D. 6,608 ft.
South Caesar, Bee County: Luling Oil & Gas Co. 3-WB Tom Slick, dual completion, 600,000 cu. ft. gas through perfs. 6,602-65 ft. and 1 bbl. distillate through 11/64-on. casing choke; 138 bbl. oil through ⅛-in. tubing choke with perfs. at 6,513-18 ft., gas-oil ratio 515, T.D. 6,606 ft.

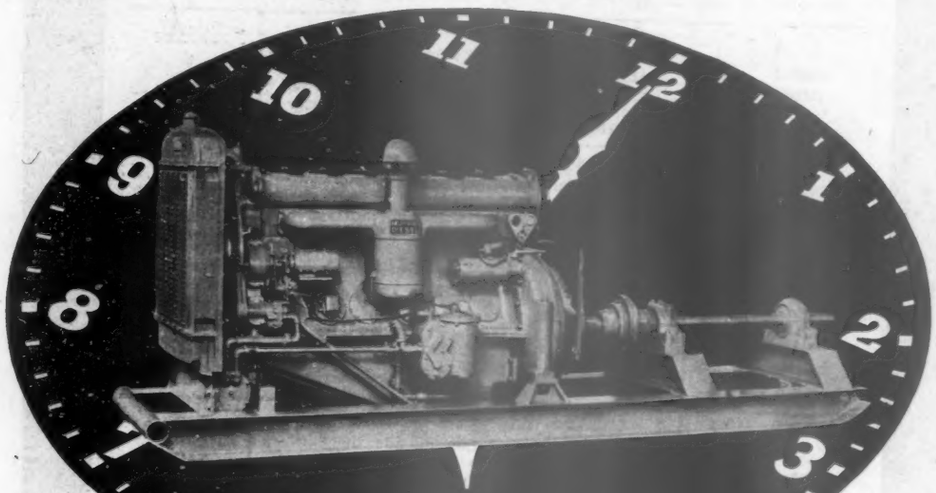
Permian Basin, Panhandle

(Continued from Page 73)

T. F. Morrow 1 Mallet, SW SW Lab. 23, Lge. 48, Edwards C.S.L. Sur., elev. 3,605 ft., flowed 761 bbl., pay 4,937 ft., acid 12,000 gal., T.D. 4,981 ft.
T. F. Morrow 10 Mallet, SE SE Lab. 21, Lge. 48, Edwards C.S.L. Sur., elev. 3,605 ft., flowed 1,326 bbl., pay 4,925 ft., T.D. 4,968 ft., acid 12,000 gal.

PANHANDLE COMPLETIONS

Moore County: Phillips Pet. Co. 1 Vanta (Carageary), Sec. 276, Blk. 4, elev. 3,605 ft., 12,500,000 cu. ft. gas, T.D. 3,320 ft.



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NORTH CENTRAL TEXAS

Strawn Field in Prospect in Northeast Archer County

By W. D. THORN

WICHITA FALLS, Tex.—Probable discovery of a new Strawn sand field in northeastern Archer County, and first pumping gage by Wise County's Bend conglomerate discovery were among chief developments in North Texas last week.

Whitaker Oil Co. of Fort Worth 1 W. M. Coleman, wildcat in Lot 25, Coleman subdivision, Archer County, 4 miles north of the town of Scotland, was waiting on cement at close of the week, with 7-in. casing set at 3,690 ft., bottomed at 3,720 ft. Before setting the oil string, three drill-stem tests were run, with recovery of approximately 300 ft. of oil, no water, on each of the first two tests, while the last test, from 3,693-3,720 ft., open 43 minutes, recovered 750 ft. of oil-cut mud along with a good show of gas.

Stanolind Oil & Gas Co. 1 Menasco, northwestern Wise County wildcat discovery, producing through casing perforated at 5,790-5,810 ft., opposite porous Bend conglomerate, pumped 205 bbl. of fluid, 90 per cent oil, 10 per cent water, on an extended initial 48-hour test. This is the first oil producer in Wise County, which, along with Montague County, was the center of the heavy leasing play that took place in the Fort Worth basin several years ago.

Youngblood & Foree 1 Sanzenbacher, Clay County wildcat southwest of Henrietta, looked definitely like a small oil well after using 8,000 gal. of acid on the Mississippian lime formation through casing perforations at 5,994-6,043 ft., but had not been officially completed.

George W. Cooper 1 Graham, eastern Young County wildcat, topped Caddo lime at 4,157 ft., had lime showing oil between 4,167-80 ft. and was running casing to test. It is in SW SW Sec. 2725, T.E.&L. Survey and was started as a 5,500-ft. test.

The Forestburg field in southeastern Montague County added a new producer last week, Sinclair Prairie 1 Hal Steadham gaging 155 bbl. pipe-line oil in 3 hours through ½-in. choke after using acid on lime pay formation at T.D. 7,204 ft. Magnolia Petroleum 1 Medley, same field, was still being rigged up to pump at T.D. 7,444 ft.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Callahan County: O. L. Wylie et al 1 J. R. Taylor, Sec. 67, B.O.A. Sur., dry, T.D. 406 ft.

Brown County: William D. Austin 1 T. S. Williams, Sec. 40, H.T.&B. Sur., gas well, gaged 260,000 cu. ft. gas, S.I. pressure 400 lb., pay 1,358-63 ft., T.D. 1,437 ft., P.B. 1,433 ft.

Central Texas Gas Co. and J. E. Whitesides 1 E. E. Kirkpatrick, John Greenwod Sur. 155, gas well, gaged 250 cu. ft. gas, pay 1,287 ft., acid 4,000 gal., T.D. 1,458 ft.

Jones County: Merry Bros. and Perini et al 1 Lonnie Maxcey, Sec. 4, Blk. 16, T.&P. Sur., dry, T.D. 2,197 ft.

Menard County: Phillips Pet. Co. 1 Treadwell, Sec. 3, Blk. 2, T.W.&N.G. Sur., location abandoned.

Shackelford County: R. H. Roark et al 1 Shackelford County fee, Sec. 4, B.A.L. Sur., pumped 20 bbl., pay 821 ft., T.D. 828 ft.

C. J. Kleiner et al 1 J. H. Nail Est., dry, T.D. 1,875 ft.

Fields

Sipe Springs, Comanche County: J. C. Hamer 4 Mary Smith, Sec. 31, B.B.B.&C. Sur. A-76, pumped 32 bbl., pay 734 ft., T.D. 753 ft.

Wimberly, Jones County: E. L. Wilson et al 2 R. F. Mashburn, Lot 86, Godwin Bros. subd., De Witt C.S.L. Sur. 126, flowed 139 bbl. in 2¼ hr. through ¾-in. choke, pay 2,278 ft., T.D. 2,301 ft.

Reddin, Taylor County: Butler & Horne et al 1-A S. M. Reddin, Lot 4, J. A. Nabers Sur. 9, flowed 175 bbl., pay 2,262 ft., T.D. 2,265 ft.

NORTH CENTRAL TEXAS COMPLETIONS

Wildcats

Baylor County: Whitaker Oil 1 Farmers Bank of Seymour, Sec. 207 T.&N.O. Sur., dry, T.D. 2,699 ft.

Young County: T. D. Humphrey 1 J. E. Barton, S. L. Tankersley Sur. A-1545, dry, T.D. 4,822 ft.

Ben H. Rankin 1 M. K. Graham, Sec. 2907 T.E.&L. Sur., dry, T.D. 4,587 ft.

Fields

Burkburnett, Shallow, Wichita County: Magnolia 46 M.P. Cropper, C. Winters Sur. A-322, water imput well, T.D. 511 ft.

Davenport, Montague County: Rogers Bros. Drlg. 1 W. B. Grimes, L. Ramey Sur. A-630, dry, T.D. 3,570 ft.

Rogers Bros. Drlg. 1 F. J. Schenk, S. Dunham Sur. A-196, dry, T.D. 3,439 ft.

Forestburg, Montague County: Sinclair Prairie 1 B. H. Steadham, G. W. Fanning Sur. A-1027, 1,250 bbl., lime 7,148-7,204 ft., T.D. 2,500 gal. acid.

Hoefle, Jack County: Hanlon-Buchanan 2 E. C. Porter, J. S. Porter Sur. A-466, 1,050 bbl., lime 4,791-4,835 ft., T.D. extension.

K.M.A., Wichita County: W. H. Hammon 11 W. H. Hammon, Sec. 2 E.T.R.R. Sur. A-762, 425 bbl., sand 3,999-4,024 ft., T.D., shot 120 qt.

G. E. Kadane & Sons 1 R. J. Bradley-B., L. C. Gibbs Sur. A-391, 571 bbl., sand 3,770-3,852 ft., T.D., shot.

Megargel, Archer County: White & Duncan 6 J. T. Richardson, M.E.P.&P. Sur. A-715, 150 bbl., sand 1,231-37 ft., T.D.

Muenster, Cooke County: A. D. Robinson 18 J. H. Otto-A, lot 5 Geo. Ivy Sur. A-516, 100 bl., pay 1,472-76 ft., T.D.

Ragland, Young County: Hanlon-Buchanan 1 Chas. Hunter, Sec. 290 T.E.&L. Sur., 577 bbl. nautral, lime 4,854-64 ft., T.D.

Ringgold, Clay County: Gulf 8 Worsham Est., Sec. 35 H.&T.C. Sur., Blk. 4, 164 bbl., shot 5,540-5,669 ft., T.D.

Rock Crossing, Wilbarger County: Phillips 216 Waggoner, Sec. 45 H.&T.C. Sur., Blk. 4, 375 bbl., lime 3,547-49 ft., T.D. 3,000 gal. acid.

Sewell, Young County: S. A. Thompson 5 J. C. Vaughan-A, Sec. 3, T.&N.O. Sur. A-1248, flowed 257 bbl., lime 4,270-75 ft., 2,000 gal. acid.

Thornberry, Clay County: Houston Bowers 1 C. J. Shumake, lot 12 Thornberry subd., dry, T.D. 1,165 ft.

Walnut Bend, Cooke County: Sinclair Prairie 13 N. Atkins, Conrad Furniash Sur. A-369 bbl., sand 4,941-54 ft., T.D.

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NORTH LOUISIANA, ARKANSAS

New Pettit Lime Pool Opened In Bossier Parish, Louisiana

SHREVEPORT, La. — Successful completion of H. L. Hunt's new pool opener, 1 Nebo, SW SE SE 3-23n-12w, just south of the Arkansas state line in Bossier Parish, was the highlight of recent developments in the North Louisiana-Arkansas area. Although not officially finished, the well was reported to be flowing at the rate of 300 to 400 bbl. of oil a day from Pettit lime at 6,029-6,122 ft. Location of the new well is about 2 miles north of the old Carterville field and midway between Haynesville and Rodessa. Considerable interest is shown in the discovery and oil men are confident that it will develop into a major field, comparable with Haynesville, which also produces from the Pettit lime.

Another wildcat test of considerable interest which recovered saturated Smackover lime is Roy Lee et al 1 Pickled in 23-17s-21w, Columbia County, Arkansas. The well is just south of the town of Magnolia and about 3 miles west of the Magnolia pool. Total depth is 8,088 ft. Electric logs were not available but casing was to be run for production tests.

NORTH LOUISIANA COMPLETIONS

Wildcat, La Salle Parish: H. L. Hunt 1-E Tensas Delta. SE NW 2-4n-4e, dry, T.D. 6,180 ft., no tops available.

Wildcat, Red River Parish: Cryer & Reese 1 Biles, SW SE 25-12n-9w, dry, T.D. 2,511 ft., Nacatoch 1,305 ft., Saratoga 1,435 ft., base Annona 1,800 ft.

Haynesville, Claiborne Parish: Midstates Oil 2 Anna Taylor, NE NE SW 3-23n-8w, flowed 14 bbl. in 6 hr., Pettit 5,358-70 ft., 5,418-28 ft., T.D. 5,446 ft.

Midstates 5 Waller, SW SW NW 3-23n-8w, flowed 108 bbl. in 9 hr., Pettit 5,371-84 ft., 5,432-42 ft., T.D. 5,460 ft.

R. A. Stacy 1 Smith, S½ SW SW 4-23n-8w, flowed 100 bbl. in 3 hr., Pettit 5,438-50 ft., 5,494-5,504 ft., T.D. 5,550 ft.

(Continued on Page 92)

Texas Gulf Coast

(Continued from Page 71)

son Survey, in Colorado County, a mile east of Ramsey, was coring at 8,321 ft. It topped the Catahoula at 1,160 ft., Vicksburg at 2,400 ft., Frio at 2,454 ft., Whitsett at 3,915 ft., Caddell at 4,713 ft., Discorbis Yeguaensis at 5,172 ft., Ceratoblimina at 6,270 ft. and Operculinella at 6,391 ft.

Four wildcats completed were dry. They were Fain Drilling Co. 1 G. Baer estate, Matagorda County; Texas 1 C. G. Hamill, Matagorda County; John Mayo and others 1 Texas Long Leaf Lumber Co., Polk County, and Pan American 1 Alex Ekvall, Wharton County.

Glenn H. McCarthy was moving in derrick and materials for a deep test in the James Spillman Survey, Abstract 175, Galveston County. It is the 1 Maco Stewart. Other Gulf Coast wildcats under way were McDannald Oil Co. 3 East Texas Oil Co., Victor Blanco Survey, Harris County; W. S. Boyle and others 1 H. Banker, I.&G.N. Survey, Jackson County; M. Christie 1 C. H. Gurinsky, R. Musquez Survey, Abstract 59, Jackson County; F. R. Jackson and B. B. Orr 1 S. J. Bishop, J. Wood Survey, Abstract 593, Walker County; Pan American 1 W. C. Babcock, S. P. Middleton Survey, Wharton County; Skelly, Tide Water and Cities Service 1 E. J. Sleeves, J. J. Dillard Survey, Abstract 18, Wharton County.

TEXAS GULF COAST COMPLETIONS

Wildcats

Matagorda County: Fain Drilling Co. 1 G. Baer est., Charles Dale Sur. A-148, E flank Big Hill dome, no shows, dry at 6,225 ft.

Texas 1 C. G. Hamill, William Baxter Sur. A-4, 4 mi. SE of Sargent, dry at 7,460 ft.

Polk County: John Mayo et al 1 Texas Long Leaf Lumber Co., J. D. Thomas Sur., 15 miles NE of Livingston, dry at 6,515 ft.

Wharton County: Pan American 1 Alex Ekvall, S. P. Middleton Sur. A-269, 2 mi. NW of Louise, dry at 6,253 ft.

Fields

Blue Ridge, Fort Bend County: Leigh J. Sessions 1 M. R. Robinson, Hicks Shropshire Sur., dry at 2,585 ft.

Clinton, Harris County: Sun-Sadie M. Oates et al, Reels & Troubrough Sur. A-59, dry at 7,323 ft.

Dyersdale, Harris County: Jack Frazier 2 C. W. Woods, Whitney Button Sur., 1,000,000 cu. ft. gas through ¼-in. choke, T.D. 9,210 ft.

Esperson, Liberty County: General Crude Oil Co. 3-A John Vagdak, O.W.W.O., old T.D. 8,778 ft., new P.B. T.D. 7,650 ft., 36 bbl. distillate through ¼-in. choke, T.P. 2,250 lb., C.P. 2,550 lb., S.I., gas-oil ratio 29,260.

Lake Creek, Montgomery County: Superior Oil Co. of California 1 C. A. Damuth, T. J. Nichols Sur., dual completion, from perfs. 9,242-48 ft., 51 bbl. distillate through ¼-in. casing choke, gas-oil ratio 12,105, and 620,000 cu. ft. gas, from perfs. 9,762-86 ft., 275 bbl. distillate through 16/64-in. choke, T.P. 2,150 lb., gas-oil ratio 4,744, T.D. 12,100 ft.

Maurbro, Jackson County: Humble 8 S. G. Drushel, B. J. White Sur. A-81, 324 bbl. through ¼-in. choke, T.P. 400 lb., C.P. 375 lb., S.I, gas-oil ratio 186, T.D. 5,231 ft.

Mayo, Jackson County: L. Crouch et al 1 T. N. Mauritz, A. Kountz Sur., dry at 6,027 ft.

North La Ward, Jackson County: Hewitt & Daugherty 3 W. C. Owens, P. Scott Sur., 102 bbl. through ¼-in. choke, T.P. 520 lb., C.P. 560 lb., S.I., gas-oil ratio 392, T.D. 5,651 ft.

Pledger, Brazoria County: Union Producing Co 1 R. McFarland est., 200,000,000 cu. ft. gas, T.D. 6,869 ft.

Saratoga, Hardin County: Rio Bravo Oil Co. T-51 fee, R. Teel Sur. A-484, dry at 2,231 ft.

Stewart, Jackson County: Texas 1 D. H. Strickler, George Sutherland Sur. A-65, 120 bbl. through 3/32-in. choke, T.P. 825 lb., C.P. 1,900 lb., gas-oil ratio 325, T.D. 5,600 ft.

Stowell, Jefferson County: Glenn H. McCarthy et al 1 Maco Stewart, T.&N.O.R.R. Co. Sur. A-371, 201 bbl. through ½-in. choke, T.P. 1,040 lb., C.P. sealed, gas-oil ratio 604, T.D. 9,205 ft.

Tomball, Harris County: Humble and Magnolia 1 William Rudle, 29 bbl. through ¼-in. choke, T.P. 250 lb., C.P. 400 lb., gas-oil ratio 278, T.D. 5,595 ft.

West Mauritz, Jackson County: Navarro Oil Co. 1 C. K. McKee, Morris & Cummings Sur. 29 A-242, dry at 6,016 ft.

Woodsboro, Refugio County: Southern Minerals Corp. 1 R. H. Wood, O.W.W.O., old T.D. 5,905 ft., new P.B. T.D. 5,850 ft., 66 bbl. through 7/64-in. choke, T.P. 1,185 lb., C.P. 1,850 lb, gas-oil ratio 1,475.

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KANSAS, NEBRASKA

Two Pools Opened by Wells With Small Potentials

By CARL HOOT

TWO small pools were opened in Kansas last week, with the balance of operations being of a routine nature. There were 9 oil wells, 5 gas and 14 dry, making a total for the week of 28 completions. The 5 gas wells were all in the rapidly expanding McLouth pool of Jefferson and Leavenworth counties.

Two miles south of the Douglas Lansing-Kansas City lime area, in Butler County, Deep Rock Oil Corp. completed its 1 Eckels, E½ SE NW 32-29-4e, for a temporary state potential of 63 bbl. of oil on swabbing tests. Pay zone is the Arbuckle lime at 2,951-56 ft., total depth. Dunn's Mill is the name given the new pool by the Kansas Nomenclature Committee.

The Stucky pool of Harvey County was opened by a small well in the Mississippian chat. H. M. Williams 1 Stucky, NE NE 3-23-3w, produced 8 bbl. of oil a day from the chat at 3,277 ft., total depth. Location is about midway between the Burrton and Halstead pools.

Five gas wells and 3 dry holes were reported from the McLouth pool of Jefferson and Leavenworth counties. Smythe & Miller 2 Todd gaged 11,650,000 cu. ft. of gas from sand at 1,425-53 ft., one of the largest yet brought in; two wells were completed for 1,000,000 cu. ft. and two others good for approximately 5 and 3 million cu. ft. a day made up the balance of completions. Hatcher-Fisk 4 Hesse flowed 4,900,000 cu. ft. from sand at 1,357-70 ft. and Hodge et al 1 Zachariah flowed 3,790,000 cu. ft.

New Pools Named

Other new fields named by the committee included Northwest Beaver, opened by Appleman 1 Stull S½ SE SW 6-16-12w, Barton County, for 408 bbl. in the Lansing-Kansas City lime; the Belpre gas pool, discovered by Cities Service 1 English, NE corner 8-25-16w, Edwards County, which produced 25,000,000 cu. ft. of gas in Lansing lime at 3,807-15 ft.; the Crowther pool of McPherson County, discovered by Westgate-Greenland 1 Crowther, S½ NW NW 26-17-1w, completed for 151 bbl. in the Mississippian chat at 2,778-94 ft.; the Pioneer pool, opened by Harwood Oil Co. 1 Proffitt, NE NE NW 25-19-10w, Rice County, which made state potential of 567 bbl. in Arbuckle lime at 3,281-90 ft. and the Curtis pool of Stafford County, with a maximum potential of 3,000 bbl., by Vickers Petroleum Co. 1 Curtis, in SE SW NW 6-22-13w.

KANSAS COMPLETIONS

Wildcats

Edwards County: N. Appleman et al 1 Malin, NE NE NE 13-25-18w, dry, T.D. 4,964 ft., Lansing 4,007 ft., Viola 4,658 ft., Mississippi lime 4,583 ft., Simpson 4,837 ft., Arbuckle 4,913 ft.

Ellis County: Tom Palmer 1 Reich, SE NW NW 19-12-20w, dry, T.D. 3,998 ft., Lansing 3,588 ft., conglomerate 3,969 ft., Arbuckle 3,986 ft.

Auto Ordnance 1 Kruetzer, E½ NE SW 4-13-19w, dry, T.D. 3,884 ft., Lansing 3,505 ft., Sooy 3,814 ft., Arbuckle 3,841 ft., show oil 3,674 ft.

McPherson County: Bay Pet. 1 Hoglund, NE NE 29-17-3w, dry, T.D. 3,550 ft., Mississippi lime 2,939 ft., Viola 3,419 ft., Simpson dolomite 3,530 ft., sand 3,537 ft.

Rush County: Auto Ordnance 1 Luft, SE NW NW 29-18-16w, dry, T.D. 3,632 ft., Lansing 3,182 ft., granite 3,629 ft.

Saline County: Veeder Supply 1 Gunnerson, SE SE SE 34-15-3w, dry, T.D. 3,530 ft., Mississippi lime 2,803 ft., Viola 3,286 ft., Simpson dolomite 3,457 ft., sand 3,482 ft., Arbuckle 3,496 ft.

Stafford County: Herndon Drlg. 1 Lynn, SE SE NW 12-21-11w, dry, T.D. 3,410 ft., Lansing 3,054 ft., Sooy 3,318 ft., Simpson 3,348 ft., Arbuckle 3,393 ft.

Fields

Chase, Rice County: Cities Service 1 Shumway, SW SW SW 23-19-9w, dry, T.D. 3,336 ft., Arbuckle 3,300 ft.

Crowther, McPherson County: Westgate-Greenland 1 Neirider, S½ NW NE 27-17-1w, 924 bbl., Mississippian chat 2,724-40 ft.

Greenvale, Russell County: Jones & Shelburne 2 Gray, S½ NW SW 33-14-12w, pumped 585 bbl., Lansing 2,984-93 ft., 2,987-95 ft., T.D. 3,231 ft.

Iuka, Pratt County: Cities Service 1 Beck, NE NE 12-27-13w, pumped 181 bbl., Simpson sand 4,241-55 ft.

Kraft-Prusa, Barton County: Barnsdall 6 Rous, SW SW 28-16-11w, dry, T.D. 3,404 ft., Arbuckle 3,398 ft.

Lindsborg, McPherson County: Auto Ordnance 1-C Sandell, SW SE 5-17-3w, swabbed 36 bbl. an hr. 600 ft. off bottom, Simpson sand 3,453-63 ft.

Linwood, Leavenworth County: Schwartz et al 1 Skinner, NW NE 30-11-22e, dry, T.D. 655 ft.

Lost Springs, Marion County: Ring-Mac Oil 3 Novak, W½ NW NE 32-17-4e, dry, T.D. 2,416 ft.

Merten, Barton County: Helmerich & Payne and Phillips 1 Merten, SE SW 3-19-15w, pumped 15 bbl., Lamotte sand 3,553-82 ft., T.D. 3,589 ft.

McLouth, Jefferson County: Hatcher-Fisk 1 Harwood, NW NW 28-9-20e, dry, T.D. 1,510 ft., sand 1,460 ft.

Hatcher-Fisk 3 Harwood, NE SW 28-9-20e, 1,000,000 cu. ft. gas, sand 1,419-28 ft.

Hatcher-Fisk 4 Hesse, NW SE 20-9-20e, 4,900,000 cu. ft. gas, sand 1,357-70 ft.

Hodge et al 1 Zachariah, SW NE 20-9-20e, 3,790,000 cu. ft. gas, sand 1,356-73 ft.

Hodge et al 2 Zachariah, NW NE 20-9-20e, dry, T.D. 1,422 ft., sand 1,385 ft.

Smythe & Miller 2 Todd, NE SE SE 20-9-20e, 11,650,000 cu. ft. gas, sand 1,425-53 ft.

McLouth, Leavenworth County: McLaughlin 1 Chas. Miller, SW SW 22-9-20e, 1,000,000 cu. ft. gas, sand 1,381-1,420 ft.

Chas. Miller 2 Miller, NE SW 22-9-20e, dry, T.D. 1,474 ft., sand 1,404 ft.

Peace Creek, Reno County: Cities Service 1-B Keesling, NW SE 1-23n-10w, flowed 170 bbl. in 13 hr., Viola 3,717-21 ft.

Auto Ordnance 1 Hollenback, SW NE SW 28-23n-10w, swabbed 40 bbl. an hr., Viola 3,803-05 ft.

Smyres, Rice County: Texas 1 Mattson, SE NW 25-19-6w, pumped 225 bbl., Mississippi lime 3,394-98 ft.

Trapp, Russell County: Pryor & Lockhart 1 Fiegler, S½ SW NE 10-15-14w, pumped 164 bbl., Arbuckle 3,251-55 ft.

FOREST CITY BASIN

ST. JOSEPH, Mo.—The most interesting test in the Forest City basin still remained a question

(Continued on Page 92)

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Book Department
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

Among the Drilling

COMMERCIAL Drilling Co. has moved a machine to the site and is ready to commence drilling a shallow test to the 1,300-ft. formation for Sam W. Collins and associates, who have staked location for the 1 Jenkins, in NW SW 14-7-9e, east of Holdenville, Hughes County, Oklahoma. The operators have a block of slightly more than 700 acres and contemplate drilling many tests.

R. M. DINGES, director of materials, District 1, of New York City, addressed members of the Appalachian Drilling Contractors Association in Bradford, Pa., last week. Forty-eight guests heard Mr. Dinges discuss Preference Rating Order P-98-b, and explain OPC Form MA-2. Roy Oakes, president of the association, conducted the business meeting, and P. J. Noon, executive director of the Pennsylvania Oil Producers Association, Bradford district, explained the procedure for appeals of gallonage of gasoline granted in ODT certificates.

SAM A. SPRINGER, Wichita, Kans., is the drilling contractor on Barbara Oil Co.'s 1 Allmon, SE SE NE 22-26s-11w, 7 miles northwest of the Cunningham pool, Pratt County, Kansas. This is a new location and is a semiwildcat.

THREEWAY Drilling Co. 1 Gray, NW NW SE 17-6s-20w, 3 miles due south of the Ray pool of Phillips County, Kansas, has set surface casing.

HOLLOW Drilling Co. 1 Debes, C W½ SW NW 30-17s-11w, 3½ miles southwest of the Kraft-Prusa pool, Barton County, Kansas, topped the Dodge lime at 2,968 ft., the Lansing-Kansas City lime series at 3,068 ft., logged a very small showing of oil from 3,150 to 3,155 ft. and was drilling at 3,330 ft. last week, looking for the Arbuckle dolomite.

GEORGE PACE, Duncan, Okla., has completed a deal with Harry Culver, Oklahoma City, Okla., to drill the 1 Rennie, in NE NE 20-1n-3w, near the edge of the old Robberson pool, in Garvin County, Oklahoma, with work to start by December 15. It is to test the bromide zone. Stanolind Oil Co. recently purchased a large spread of acreage around the well, including most of Mr. Culver's lease block.

S. J. BROWN, of Falls City, Neb., has drilling contract for a test to be drilled by R. L. Ferguson and Edwin S. Towle, of Falls City, location for which has been staked in C NE NW 24-1n-17e, a mile southeast of Rulo, in Richardson County, Nebraska. The test will be the 1 Catherine Tiehen. Location is on a farmout from Carter Oil Co.

W. T. PAYNE and his BIG CHIEF Drilling Co., of Oklahoma City, Okla., have quit wildcatting and will devote their time to contract drilling until restoration of more normal conditions in the industry. The company has seven rigs running on contract jobs, four of these being in Illinois, two in Texas, and one in Oklahoma. Last year the firm drilled 12 wildcat wells and 4 wells in proved areas.

PARKER Drilling Co., Tulsa, has been awarded contract to drill a 7,500-ft. wildcat test for Barnsdall Oil Co., in northeast central Yoakum County, Texas. The test is the firm's 1 H. D. Heath, 660 ft. from north and east lines of Section 315, Block D, John H. Gibson Survey. Location falls 6 miles northeast of Plains and 2½ miles west and slightly south of the old Gulf States Oil Corp. and Herschbach Drilling Co. 1 E. A. Graham, a 5,377-ft. dry hole. This will be a rotary test and operations will start immediately.

R. P. COATS, Midland, Tex., has received the contract for a shallow wildcat in Lea County, New Mexico, which has been staked by Felmont Corp., as its 1 State, in the center of Lot 11, 5-21s-33e, 2½ miles west of the Lynch area. The test is contracted to 3,850 ft.

HOLLANDSWORTH Drilling Co. has the contract to drill a proposed Woodbine sand test for Dean Brothers, Fort Worth, Tex., on their block of some 10,000 acres in Marion County, Texas. The test, the 1 James E. Hale, is on a 28-acre tract in the W. C. Ward Survey, and lies north of two failures drilled in November 1941.

BUTLER & HORNE Drilling Co., Dallas, Tex., was attempting to make a producer out of 3 Hudson, in the Reddin field, Jones County, Texas, which had a show in lime from 2,518 to 2,520 ft.

B. & R. Drilling Co. and CHET ROBERTS will drill N. Appleman & Co. and Aero Parts Manufacturing Co. 1 Long, in CW NW SW 10-26s-12w, 6 miles northeast of the Iuka pool and 13 miles northwest of the Cunningham pool, in Pratt County, Kansas.

GEORGE H. ECHOLS, Houston, Tex., contractor, has started a deep test for his own account in the Napoleonville wildcat area of Assumption Parish, Louisiana. It is 1 Kessler & Sternfels, 136-12s-14e.

HARRISON & DILLARD, Houston, Tex., are rigging up for a wildcat test, 1 Stephens, 5 miles west of Eagle Lake, Colorado County, Texas, for Cities Service Co. The projected depth is 10,500 ft. The same company has tools running on a well for Shell Oil Co. 1 Neuhaus, Lavaca County, Texas, to go 10,000 ft.

JACK W. FRAZIER, Houston, Tex., is rigging up for a wildcat test in 12-12s-7w, Cameron Parish, Louisiana. It is for his own account.

W. P. TAYLOR Drilling Co., Houston, Tex., has the contract for a wildcat test for Pan American Production Co., near Louise, in Wharton County, Texas. The well, 1 Babcock, is planned to go to 6,000 ft.

HOUSH & THOMPSON Drilling Co., Houston, Tex., have started work on a wildcat in Harris County, Texas, for O. W. Killam. It is 1 M. A. Dodds fee 10 miles northeast of Addicks, 660 ft. south of the Smith Survey and 660 ft. west of Section 14, W.C.R.R. Survey.

BALDRIDGE & KING, McAllen, Tex., are drilling a 6,000-ft. test for their own account in the South La Reforma area of Starr County, Texas. The location, 2 F. B. Guerra, is 1,600 ft. east of Magnolia's gas-distillate discovery, 1 Guerra.

C. I. Drilling Corp., Houston, Tex., has the contract for a 10,000-ft. test, 1 Armelise Planting Co., to be drilled for William Helis in the Napoleonville area of Assumption Parish, Louisiana. The same contractor is close to completion of a semi-wildcat, 1 Samuel Haas estate, for C. I. Production C., Inc., and Kirby Petroleum Co. in Evangeline Parish.

HOLLANDSWORTH Drilling Co., Longview, Tex., has been awarded the contract to drill a projected Woodbine sand wildcat test for Dean Brothers, of Fort Worth, Tex., in western Marion County, Texas, the third on a block of approximately

Contractors

10,000 acres as assembled several years ago. Operator was moving in materials last week. The new prospect is the 1 James E. Hale, about 1 mile northwest of Lassiter and 10 miles northwest of Jefferson. Contractor was moving rig from the 1 Benefield & Singleton, a recently completed oil producer from the Gloyd lime in the Kildare field of South Cass County.

LON H. CRON, Houston, Tex., has contracts to put down two holes for Continental Oil Co. One is a wildcat, 1 O. F. Allenson, 13 miles northwest of El Campo, Wharton County, Texas. The other, B-13 Robert Driscoll, is in the Driscoll field of Duval County, Texas.

ALLEN & MORRIS, San Antonio, Tex., were getting ready to spud 2 M. B. Mastin, a wildcat in Nueces County, Texas, about 2 miles northwest of the Shields field, for Phillips Petroleum Co.

KIRKWOOD & MORGAN, Laredo, Tex., will drill 1 Reyes in Duval County, Texas, for Circle Oil Co. The location is in wildcat territory east of the Kreis field.

C. C. GILGER will drill for Phillips Petroleum Co., a new test on the G. R. Gray tract in the Watson and Hopson surveys, Cass pool, Cass County, Texas. The proposed test would be a north offset to the Texas Co. 1 Benefield & Singleton, a west-edge well completed some 3 weeks ago. Rig will be moved to location when Gilger completes a new test in Caddo Parish, Louisiana.

PARKER Drilling Co. has the contract for Amerada Petroleum Co. 1 House, in C SE NW 2-1n-3w, north of the Robberson pool, Garvin County, Oklahoma, which was drilling at 5,478 ft. in lime.

OLSON Drilling Co. has the contract to drill a wildcat in Crockett County, Texas, for John T. Moore and P. D. Moore, of Midland, Tex. The operators have staked their 1 J. S. Todd estate, 660 ft. from south and west lines of Section 16, Block YZ, E.L.&R. Survey, a 7,500-ft. test. Olson was moving in rotary last week.

J. S. PITTMAN has been awarded contract and was moving in spudder to drill a wildcat test in Crockett County, Texas, for John I. and P. D. Moore, which will be the 1 Shannon estate, 660 ft. from south and west lines of Section 21, Block YZ, I.& G.N. Survey. It is contracted to 2,500 ft.

POHLAND Drilling Co. will drill a test for Moore Brothers, of Midland, Tex., 2¼ miles from their 1 Shannon estate, in Crockett County, Texas. The test will be 660 ft. from north and west lines of Section 12, Block Q, John Small Survey. It will be taken to 2,500 ft. Contractor was moving in spudder.

DELTA Drilling Co., Tyler, Tex., has opened a new pool in Woods County with high-gravity production coming from the Paluxy zone. The test was on a farmout from Shell Oil Co., Inc., and was drilled by Delta and Rube Benton, of Fort Worth. Tex.

S. C. HERRING, of Abilene, Tex., is drilling a wildcat test on the Jones-Taylor County line for Fain-McGaha Oil Corp. The test is west of the Wimberly pool in the northwest corner of Sub. 29, League 124, Grimes County School Land in Southwest Texas.

W. W. ZIMMERMAN, drilling contractor and independent operator of McAllen, Tex., was moving in materials to start the D. G. Bintliff 1 W. M. Garcia, Share 7-B, Porcion 91, Camargo jurisdiction, Starr County, Texas. This test is located north of the Ullrich field and south of Rincon field production.

MORAN Drilling Co. has contract to drill the 1 Moody, for Danciger Oil & Refineries, in C NE SE 28-5n-3e, near the Byars area, McClain County, Oklahoma. Test was spudding this week, and the contract is for 3,600 ft., or the Viola lime. Location is on a block of 600 acres.

MOUSER Drilling Co. is starting on a contract in SW SW NW 33-18-7w, on a 640-acre block east of the Geneseo pool, Rice County, Kansas, for Charles M. Coates et al.

R. C. ADAMS will drill a test for Humble Oil & Refining Co., which will be known as the 1 J. T. Harris. Location for the test has been staked on the 102-acre tract of J. T. Harris in the R. C. Farmer Survey, about 9½ miles southwest of Center, Tex.

BRYAN Petroleum Co., contractor for Burns Oil Co. 1-A Kinch, in NW SW SE 18-3s-10e, near Boggy Depot. Atoka County, Oklahoma, was drilling below 2,708 ft. with cable tools. A lime was encountered at 2,697 ft. that the crew believes was the Viola lime.

●

Bulletins Issued on Oil Operating Suggestions

The first of a proposed series of bulletins titled "Suggestions for Oil Producers During the War" was released December 3 by Deputy Petroleum Administrator Ralph K. Davies.

The bulletin contains 18 detailed suggestions that are intended to assist oil operators in solving some of the problems with which they must contend as a result of the war.

Prepared by the Petroleum Administration's Production Division, the publication includes suggestions on the following subjects:

Saving materials by proper selection of casing and tubing strings, use of such substitute equipment as automobile engines in production operations, prestressed reinforced concrete storage tanks, radial-type pipe manifolds, saving materials in water-flood operations and consolidation of lease equipment.

The bulletin also contains a list of compressors and engines for sale, with the description and price of each item. This list has been included because there is a critical shortage of this type of equipment, and it is the Petroleum Administration's policy, under such circumstances, to advise prospective buyers where the required material is available.

Oil producers are asked to forward any suggestions they might have on any workable methods developed in their organization for saving materials, for substituting noncritical materials, or for improving operations. The Production Division, however, reserves the right to reject any ideas that have not been tried and have not been proved to be worthwhile or practicable.

Sent to some 500 operators who drilled more than 25,000 feet of hole in 1941 the bulletin is available to all oil producers by writing to "Don R. Knowlton, Director of Production, Petroleum Administration for War, South Interior Building, Washington, D. C."

All requests should be written on company letterhead and should include the names, positions, and addresses of the key men in the organization to whom the series is to be mailed.

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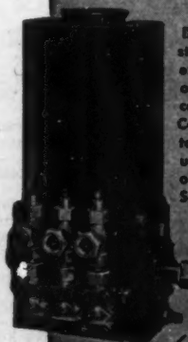

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CRUDE PRICES . . .

OKLAHOMA AND KANSAS GRAVITY TABLES

	1	2	3	4	5	6	7
Below 21					$.85	$.75	
21-21.9					.87	.78	
22-22.9					.89	.81	
23-23.9					.91	.84	
24-24.9					.93	.87	
Below 25	$.93			$.86			
25-25.9	.95	$.95		.88	.95	.90	
26-26.9	.97	.97		.90	.97	.93	
27-27.9	.99	.99		.92	.99	.96	
28-28.9	1.01	1.01	$1.01	.94	1.01	.99	
29-29.9	1.03	1.03	1.03	.96	1.03	1.02	
30-30.9	1.05	1.05	1.05	.98	1.05	1.05	$1.05
31-31.9	1.07	1.07	1.07	1.00	1.07	1.07	1.07
32-32.9	1.09	1.09	1.09	1.02	1.09	1.09	1.09
33-33.9	1.11	1.11	1.11	1.04	1.11	1.11	1.11
34-34.9	1.13	1.13	1.13	1.06	1.13	1.13	1.13
35-35.9	1.15	1.15	1.15	1.08	1.15	1.15	1.15
36-36.9	1.17	1.17	1.17	1.10	1.17	1.17	1.17
37-37.9	1.19	1.19	1.19	1.12	1.19	1.19	1.19
38-38.9	1.21	1.21	1.21	1.14	1.21	1.21	1.21
39-39.9	1.23	1.23	1.23	1.16	1.23	1.23	1.23
40 and above	1.25	1.25	1.25	1.18	1.25	1.25	1.25

OKLAHOMA AND KANSAS TABLE EXPLANATION

COLUMN (1) MID-CONTINENT GRADES:
Pure Oil Co., 5-20-41.
Gulf Oil Corp., 5-20-41.
Skelly Oil Co. (Kansas only), 5-19-41.
H. F. Wilcox Oil & Gas Co., 5-20-41.

COLUMN (2) MID-CONTINENT GRADES:
White Eagle Oil Purchasing Co., Inc., 5-19-41, Kansas only.
Sinclair Prairie Oil Marketing Co., 5-20-41.

COLUMN (3) MID-CONTINENT GRADES:
Continental Oil Co., 5-19-41.
Phillips Petroleum Co., 5-19-41.
Tide Water Associated Oil Co., 5-20-41.

COLUMN (4) JACKSON, TILLMAN COUNTIES:
Gulf Oil Corp., 5-20-41.

COLUMN (5) MID-CONTINENT GRADES:
Standard Oil Co. (Indiana), 5-20-41.
National Refining Co., 5-20-41.

COLUMN (6) MID-CONTINENT GRADES:
Magnolia Petroleum Co., 5-21-41.
Shell Oil Co., Inc., 5-19-41.
Shell, in Carter County, 12-5-41.
Ben Franklin Refining Co., 12-4-41.
Carter Oil Co. (Oklahoma only), 5-19-41.

COLUMN (7) OKLAHOMA:
Champlin Refining Co., 5-20-41.

OKLAHOMA FLAT PRICE

Cumberland $1.14
Pure Oil Co., 9-4-41.

Canadian Fields

Imperial Oil, Ltd.:
Petrolia, 11-6-39 ..... $2.10
Oil Springs, 11-6-39 ..... 2.07
Bothwell, 11-6-39 ..... 2.10
Turner Valley, 7-16-41 ..... $1.85-1.97

MIDDLE WEST FLAT PRICES

Illinois and Indiana

Ohio Oil Co.:
Illinois basin, 5-21-41 ..... $1.37
Eastern Illinois, 5-21-41 ..... $1.22
Western Indiana, 5-21-41 ..... 1.22
Magnolia Petroleum Co.:
Illinois basin, 5-21-41 ..... $1.37
Carter Oil Co.:
Illinois (Louden), 5-21-41 ..... $1.37
Sohio Corp.:
Illinois basin, 5-21-41 ..... $1.37
Texas Co.:
Illinois basin 5-21-41 ..... $1.37
Gulf Refining Co.:
Illinois basin 5-21-41 ..... $1.37

Michigan

Simrall Corp., 5-27-41:
Greendale, Porter, Vernon, Crystal, and Wise $1.44
Buckeye, Bentley, Edenville, Beaverton, and Monitor (sweet) .. 1.42
Freeman, Redding, Lincoln, and Winterfield 1.39
Hamilton-Grout 1.29
West Branch-Arenac 1.24
Sohio Corp., 5-1-41:
Bloomingdale-Columbia $1.38
Mid-West Refineries, Inc., 5-1-41:
Kent County $1.38
Pure Oil Co., 5-27-41:
Sherman $1.39
Midland (Midland County) 1.44

EASTERN STATES

Pennsylvania and Ohio

South Penn Oil Co.:
National lines, 3-26-42 ..... $3.00
Southwest Penn, 3-26-42 ..... 2.65
Eureka lines, 3-26-42 ..... 2.59
Corning grade, 5-27-41 ..... 1.51
Tide Water Associated Oil Co.:
Bradford, 3-26-42 ..... $3.00
Allegany, N. Y., 3-26-42 ..... 3.00
Pennzoil Co.:
Group A, 3-26-42 ..... $2.93
Group B, 3-26-42 ..... 2.92
Group C, 3-26-42 ..... 2.91
Group D, 3-26-42 ..... 2.90
Group E, 3-26-42 ..... 2.88
Quaker State Oil Refining Corp.:
In Buckeye lines, 3-26-42 ..... $2.55
In Eureka lines, 3-26-42 ..... 2.59

Kentucky

Ashland Oil & Transportation Co., 6-19-41:
Big Sandy River $1.38
Kentucky River 1.43
Sohio Corp., 5-21-41:
Birk City $1.32

West Virginia

Pure Oil Co.:
Cabin and Kelly Creek, 3-27-42 .. $2.59
Smackover (heavy) $0.93
Dorcheat 1.18
Phillips Petroleum Co., 5-22-41:
Smackover (heavy) $0.80
Placid Oil Co., 5-22-41:
Tullos-Urania (5-21-41) $1.18
Cotton Valley dist. (above 60°) 1.30
Cotton Valley (Holloway sand) .. 1.25
Cotton Valley (Bodcaw-D sands) .. 1.20
Pure Oil Co.:
Bosco (5-21-41) $1.14
Sweet Lake (5-22-41) 1.06
Creole (5-22-41) 1.16
Republic Oil Co., 6-2-41:
Nevada County, Arkansas $0.80
Shell Oil Co., Inc., 5-20-41:
Happytown $1.18
Standard Oil Co. of Louisiana, 5-22-41:
Big Creek, Dorcheat, McKamie (sour) $1.18
Smackover (heavy) ..... .83
Cotton Valley distillate (9-1-41) .. 1.40
Cotton Valley (Holloway sand) .. 1.25
Lisbon distillate 1.20
Republic Oil Refining Co., 5-21-41:
Bayou Pigeon $1.20
Texas Co., 5-21-41:
Erath $1.21
Garden Island 1.36
Lafitte, Paradis 1.19
Lake Mongoulois 1.36

ROCKY MOUNTAIN GRAVITY TABLE

Below 29	$0.90
29-29.9	.90
30-30.9	1.00
31-31.9	1.02
32-32.9	1.04
33-33.9	1.06
34-34.9	1.08
35-35.9	1.10
36-36.9	1.12
37-37.9	1.14
38-38.9	1.16
39-39.9	1.18
40 and above	1.20

Stanolind Oil & Gas Co., 5-20-41, includes Dutton Creek, Midway, and Salt Creek except Tensleep crude, Wyoming

Sinclair-Wyoming Oil Co., 5-20-41, includes Salt Creek and Lost Soldier, except Tensleep crude, Wyoming.

Continental Oil Co., 5-21-41, includes Fort Collins and Wellington, Colorado

Wyoming

Ohio Oil Co.:
Rock River (5-20-41) $1.18
Lance Creek (7-1-41) 1.12
Elk Basin and Grass Creek (light) 1.00
Stanolind Oil & Gas Co., 5-20-41:
Frannie (light) ..... .70
Frannie (heavy) ..... .47
Grass Creek (light) 1.00
Grass Creek (heavy) ..... .50
Hamilton dome ..... .45
Elk basin 1.00
Salt Creek (Tensleep) ..... .6755
Continental Oil Co.:
Big Muddy (5-30-41) $1.08
Lance Creek (9-1-41) 1.13

Montana

Continental Oil Co., 4-1-41:
Cat Creek $1.18

Colorado

Stanolind Oil & Gas Co., 5-20-41:
Iles $1.07
Continental Oil Co., 5-21-41:
Canon City-Florence $1.00

LOUISIANA AND SOUTHERN ARKANSAS GRAVITY TABLE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Below 18													$.94					
18-18.9													.96					
19-19.9													.98					
Below 20								$1.08		$.94	$.99	$.89			$1.06			
20-20.9								1.08		.96	1.01	.91	1.00		1.08			
Below 21	$.68			$.90										$.90				
21-21.9	.70			.92				1.10		.98	1.03	.93	1.02	.92	1.10			
22-22.9	.72			.94				1.12		1.00	1.05	.95	1.04	.94	1.12			
23-23.9	.74			.97				1.14		1.02	1.07	.97	1.08	.96	1.14			
24-24.9	.76			.98				1.16		1.04	1.09	.99	1.11	.98	1.16			
Below 25		$.86	$.98			$.88												
25-25.9	.78	.88	1.00	1.00		.90		1.18		1.06	1.11	1.01	1.14	1.00	1.18			
26-26.9	.80	.90	1.02	1.02		.92		1.20		1.08	1.13	1.03	1.17	1.02	1.20			
27-27.9	.82	.92	1.04	1.04		.94		1.22		1.10	1.15	1.05	1.19	1.04	1.22			
28-28.9	.84	.94	1.06	1.06		.96		1.24		1.12	1.17	1.07	1.21	1.06		$1.14	$1.06	
29-29.9	.86	.96	1.08	1.08		.98		1.26		1.14	1.19	1.09	1.23	1.08		1.16	1.08	
30-30.9	.88	.98	1.10	1.10	$1.28	1.00		1.28		1.16	1.21	1.11	1.25	1.10		1.18	1.10	$1.05
31-31.9	.90	1.00	1.12	1.12	1.30	1.02		1.30	$1.07	1.18	1.23	1.13	1.27	1.12		1.20	1.12	1.07
32-32.9	.92	1.02	1.14	1.14	1.32	1.04		1.32	1.09	1.20	1.25	1.15	1.29	1.14		1.22	1.14	1.09
33-33.9	.94	1.04	1.16	1.16	1.34	1.06		1.34	1.11	1.22	1.27	1.17	1.31	1.16		1.24	1.16	1.11
34-34.9	.96	1.06	1.18	1.18	1.36	1.08		1.36	1.13	1.24	1.29	1.19	1.33	1.18		1.26	1.18	1.13
35-35.9	.98	1.08	1.20	1.20	1.38	1.10			1.15					1.20		1.28	1.20	1.15
Below 36							$1.07											
36-36.9	1.00	1.10	1.22	1.22	1.40	1.12	1.09		1.17					1.22		1.30	1.22	1.17
37-37.9	1.02	1.12	1.24	1.24	1.42	1.14	1.11		1.19									1.19
38-38.9	1.04	1.14	1.26	1.26	1.44	1.16	1.13		1.21									1.21
39-39.9	1.06	1.16	1.28	1.28	1.46	1.18	1.15		1.23									1.23
40 & above	1.08	1.18	1.30	1.30	1.48	1.20	1.17		1.25									1.25

LOUISIANA AND SOUTHERN ARKANSAS TABLE EXPLANATION

Standard Oil Co. of Louisiana, 5-22-41.

COLUMN (1) applies to Atlanta, Buckner, Magnolia, Schuler (Jones sand), Village, and Lewisville fields.

COLUMN (2) applies to De Soto, Sabine, Fouke, Homer, Miller County, Sugar Creek, and Nebo.

COLUMN (3) applies to Bunkie, Eola, Olla, and South Olla.

COLUMN (4) applies to Bayou Mallet, Choctaw, Darrow, Jeanerette, Lirette, North Crowley, South Crowley, Port Barre, Potash, Roanoke, St. Martinville, and Port Allen.

COLUMN (5) applies to University (Baton Rouge). Posted 6-2-42.

COLUMN (6) applies to Cotton Valley crude, Rodessa and Shreveport (Cross Lake); also Anse La Butte, effective 8-1-41, starting at 80 cents for below 21°, also, to Caddo effective 10-15-41.
Continental Oil Co., 5-21-41.

COLUMN (7) applies to Abbeville, Louisiana.
Stanolind Oil & Gas Co., 5-21-41.

COLUMN (8) applies to East and West Hackberry.

COLUMN (6) applies to Caddo Parish, effective 10-15-41.

COLUMN (9) applies to Evangeline, Acadia Parish.
Lion Oil Refining Co., 5-22-41.

COLUMN (1) applies to Reynolds lime, Jones sand, Schuler, Ark.

COLUMN (2) applies to El Dorado, West and South Rainbow fields, Snow Hill, and Schuler-Morgan sand.
Placid Oil Co., 5-22-41.

COLUMN (3) applies to Olla.

COLUMN (2) applies to Nebo field.
Shell Oil Co., Inc., 5-20-41.

COLUMN (10) applies to Roanoke, Chalkley.

COLUMN (11) applies to Iowa, Black Bayou, White Castle.

COLUMN (12) applies to Gibson, South Houma, Hester, West Lake Verret.
Magnolia Petroleum Co., 5-21-41.

COLUMN (13) applies to Lockport, Cameron Meadows, and West Gueydan, La.

COLUMN (6) applies to Haynesville, Cotton Valley, Rodessa, La., and Miller County, Arkansas.
Phillips Petroleum Co., 3-29-41.
Arkansas Fuel Oil Co., 2-19-42.

COLUMN (1), Schuler (Jones sand), except schedule starts at 76 cents for below 25° gravity.
Gulf Refining Co., 5-21-41.

COLUMN (9), Jennings.

COLUMN (8), Edgerly, Starks, Vinton East Hackberry, Cameron Meadows, and Leesville.

COLUMN (16) applies to Grand Bay, Quarantine Bay, Timbalier Bay, and West Bay, except schedule starts at $1.12 for below 28° gravity.

COLUMN (6) applies to Caddo, Homer, Bull Bayou, Crichton, De Soto, Haynesville, and El Dorado.

COLUMN (4) applied to West Gueydan, effective 5-25-42.
Pure Oil Co., 4-22-41.

COLUMN (14) applies to Gueydan crude.

COLUMN (6), Caddo, Homer, Haynesville, Bull Bayou, Crichton, De Soto, and El Dorado.
Texas Co., 5-21-41.

COLUMN (6) applies to North Louisiana.

COLUMNS (15) and (16), Bay St. Elaine, Caillou Island, Iberia, Lake Barre, Lake Pelto, Leesville, Port Barre. (Schedules A and B).

COLUMN (17), Bateman Lake, Dog Lake, Fausse Point, Horseshoe Bayou, Jefferson Island, Plumb Bob, Vermilion Bay, West Cote Blanche, and Delta Duck Club.

COLUMN (18), Delta Farm, Lake Salvador, Golden Meadow.

LOUISIANA AND ARKANSAS FLAT PRICES

Continental Oil Co., 5-21-41:
Tepetae and Lake Arthur $1.18
Ville Platte 1.20
Gulf Refining Co., 5-21-41:
Smackover (Ark.) $0.83
Lion Oil Refining Co., 5-22-41:

TEXAS GULF COAST GRAVITY TABLES

	(1)	(2)	(3)	(4)	(5)
Below 20	$1.06	$1.06		$.98	$.93
20-20.9	1.08	1.08		1.00	.96
Below 21			$1.08		
21-21.9	1.10	1.10	1.10	1.02	.97
22-22.9	1.12	1.12	1.12	1.04	.99
23-23.9	1.14	1.14	1.14	1.06	1.01
24-24.9	1.16	1.16	1.16	1.08	1.03
25-25.9	1.18	1.18	1.18	1.10	1.05
26-26.9	1.20	1.20	1.20	1.12	1.07
27-27.9	1.22	1.22	1.22	1.14	1.09
28-28.9	1.24	1.24	1.24	1.16	1.11
29-29.9	1.26	1.26	1.26	1.18	1.13
30-30.9	1.28	1.28	1.28	1.20	1.15
31-31.9	1.30	1.30	1.30	1.22	1.17
32-32.9	1.32	1.32	1.32	1.24	1.19
33-33.9	1.34	1.34	1.34	1.26	1.21
34-34.9	1.36	1.36	1.36	1.28	1.23
35-35.9	1.38		1.38	1.30	1.25
36-36.9	1.40		1.40	1.32	1.27
37-37.9	1.42		1.42	1.34	1.29
38-38.9	1.44		1.44	1.36	1.31
39-39.9	1.46		1.46	1.38	1.33
40 and above	1.48		1.48	1.40	1.35

TEXAS GULF COAST GRAVITY TABLE EXPLANATION

COLUMN (1):
Humble Oil & Refining Co., 5-21-41, includes Amelia, Clear Lake, Goose Creek, Hastings, Magnet, Mykawa (new), Raccoon Bend, South Thompsons Sugarland, Thompson, and Webster fields.

Stanolind Oil & Gas Co., 5-21-41, includes West Beaumont, High Island, and Spindletop.

Sinclair Prairie Oil Marketing Co., 5-21-41.

Stanolind Oil Purchasing Co., 4-9-42, includes Clinton and Lake Creek.

Pure Oil Co., 4-21-41, includes Louise and Ganado.

Gulf Refining Co., 5-21-41, includes Spindletop, Sour Lake, Lovells Lake

West Beaumont, Goose Creek, South Liberty, Big Creek, Blue Ridge, Fannett, Moore, Barbers Hill, Hankamer, Thompson, Lochridge, Dyersdale, and Hull (old).

Sun Oil Co., 5-21-41, includes Barbers Hill, Batson (old), Bayou Blue, Chachsoula, Cotton Lake, Esperson (below 35° gravity), Fausse Point, Goose Creek, Greens Lake, Hackberry (east and west), Hull (below 25°), Humble (below 35°), Nome, North Dayton (below 25°), Orange, Saratoga, Sour Lake, South Liberty, and Vinton.

COLUMN (2):
Texas Co., 5-21-41, includes Arriola, Ganado, Hamman, Hillje, Humble, Kubela, Magnet, Manvel, Markham, Mauritz, Old Ocean, Pickett Ridge, Port Neches, Sour Lake, West Columbia, and Withers.

COLUMN (3):
Pan American Production Co., 5-21-41 includes Hastings and South Houston.

Stanolind Oil & Gas Co., 4-1-41, includes High Island, Spindletop, Hastings, and South Houston.

COLUMN (4):
Humble Oil & Refining Co., 5-21-41, includes Anahuac, Angleton, Cedar Point, Fishers' Reef, Hull (new and old), Pierce Junction, Red Fish Reef, and Turtle Bay.

Gulf Refining Co., 5-21-41, includes Anahuac, Hull (new), Thompson (deep), Pierce Junction, and Orange.

Sun Oil Co., 5-21-41, includes Anahuac, Caplen and Turtle Bay.

Humble Oil & Refining Co., 3-29-41, includes Dickinson, Gillock, Hardin, League City, and Rowan.

COLUMN (5):
Pan American Production Co., 5-21-41, includes Gillock, except scale starts at 95 cents below 21°.

Stanolind Oil Purchasing Co., 5-21-41, includes Fairbanks, North Houston, and Roslyn.

SOUTH TEXAS AND SOUTHWEST TEXAS GRAVITY TABLES

	1	2	3	4	5	6	7
Below 20	$1.03	$1.08	$1.08	$.89	$1.03	$1.03	$1.08
20-20.9	1.05	1.10	1.10	.90	1.05	1.05	1.10
21-21.9	1.07	1.12	1.12	.91	1.07	1.07	1.12
22-22.9	1.09	1.14	1.14	.92	1.09	1.09	1.14
23-23.9	1.11	1.16	1.16	.93	1.11	1.11	1.16
24-24.9	1.13	1.18	1.18	.94	1.13	1.13	1.18
25-25.9	1.15	1.20	1.20	.95	1.15	1.15	1.20
26-26.9	1.17	1.22	1.22	.96	1.17	1.17	1.22
27-27.9	1.19	1.24	1.24	.97	....	1.19	1.24
28-28.9	1.21	1.26	1.26	.98	....	1.21	1.26
29-29.9	1.23	1.28	....	.99	....	....	1.28
30-30.9	1.25	1.30	....	1.00	....	....	1.30
31-31.9	1.27	1.32	....	1.01	....	....	1.32
32-32.9	1.29	1.34	....	1.02	....	....	1.34
33-33.9	1.31	1.36	....	1.03	....	....	1.36
34-34.9	1.33	1.38	....	1.04	....	....	1.38
35-35.9	1.35	1.40	....	1.05	....	....	1.40
36-36.9	1.37	1.42	....	1.06	....	....	....
37-37.9	1.39	1.44	....	1.07	....	....	....
38-38.9	1.41	1.46	....	1.08	....	....	....
39-39.9	1.43	1.48	....	1.09	....	....	....
40 and above	1.45	1.50	....	1.10	....	....	....

SOUTH AND SOUTHWEST TEXAS TABLE EXPLANATION

COLUMN (1) MIRANDO:
Humble Oil & Refining Co., 5-21-41, includes Blanchard Bridwell, Colorado, Comitas, Eagle Hill, Escobas, Fitzsimmons, Glen, Government Wells (North and South), Heyser, Hoffman, Kelsey, Kohler, Loma Novia, Lundell, Manila, Mirando Valley, Placedo, Randado, Sarnosa, and Tesoro.
Magnolia Petroleum Co., 5-21-41.
Continental Oil Co., 7-1-41. Includes Hoffman, Government Wells (North and South), Lopez, Moco, Colmena, Seven Sisters, South Seven Sisters, Loma Novia, Conoco Driscoll, O'Hern, Piedre Lumbre, and Taranchauas.
American Mineral Spirits Co., 5-21-41, includes Adami and Munson.
Republic Oil Refining Co., 5-21-41, includes Heyser field crude.
COLUMN (2) REFUGIO:
Continental Oil Co., 7-1-41, includes Minnie Bock, Clara Driscoll, South Clara Driscoll, Driscoll Ranch, Orange Grove, and Wade City.
Humble Oil & Refining Co., 5-21-41, includes East White Point, Greta, Melon Creek, O'Connor-McFaddin, Plymouth, Saxet, Taft, and Tom O'Connor.
American Mineral Spirits Co., 5-21-41, includes Plymouth, Taft, and East White Point.
COLUMN (3) REFUGIO:
Texas Co., 5-21-41, includes Greta, Saxet, and Taft.
COLUMN (4) LA ROSA:
American Mineral Spirits Co., 3-29-41.
COLUMN (5) DUVAL-MIRANDO:
Sun Oil Co., 5-21-41.
COLUMN (6) DUVAL-MIRANDO:
Texas Co., 5-21-41.
COLUMN (7) NUECES COUNTY:
American Mineral Spirits Co., 5-21-41.
Republic Oil Refining Co., 5-21-41.

WEST TEXAS, PANHANDLE AND NEW MEXICO TABLE EXPLANATION

COLUMN (1):
Humble Oil & Refining Co., 5-21-41, includes Andrews, Crane, Crockett, Ector, Gaines, Glasscock, Howard, Reagan, Upton, Winkler, and Yoakum counties, West Texas, and Lea County, New Mexico.
Gulf Refining Co., 5-21-41, includes Crane, Ector, Upton, Ward, and Winkler counties, West Texas.

COLUMN (2):
Sinclair Prairie Oil Marketing Co., 5-21-41, includes West Texas and Lea County, New Mexico. Effective 5-29-41 in Eddy County, New Mexico.
Magnolia Petroleum Co., 5-21-41, includes Upton, Howard, Glasscock, Mitchell, Winkler, Cochran, Hockley, Yoakum, and Gaines counties.
COLUMN (3):
Texas Co., 5-21-41, includes Crane and Winkler counties, Texas, and Lea County, New Mexico.
COLUMN (4) TEXAS PANHANDLE:
Magnolia Petroleum Co., 7-9-41.
Continental Oil Co., 7-9-41.
Phillips Petroleum Co., 7-9-41.
COLUMN (5) WINKLER AND LEA:
Stanolind Oil & Gas Co., 5-21-41, includes Winkler County only.
Gulf Refining Co., 5-21-41, includes Lea County, New Mexico, only
COLUMN (6) GRAY COUNTY:
Texas Co., 5-21-41.
H. F. Wilcox Oil & Gas Co., 7-9-41.
COLUMN (7) LEA COUNTY:
Magnolia Petroleum Co., 5-21-41.
COLUMN (8) EDDY COUNTY:
Continental Oil Co., 5-30-41.
COLUMN (9):
Shell Oil Co., Inc., 5-20-41, includes Crane, Ector, Howard, Glasscock, Upton, Winkler, and Yoakum counties, Texas, and Lea County, New Mexico.
COLUMN (10) TEXAS PANHANDLE:
Humble Oil & Refining Co., 7-9-41.
COLUMN (11) PANHANDLE:
Sinclair Prairie Oil Marketing Co., 5-23-41.

WEST TEXAS, PANHANDLE, AND NEW MEXICO GRAVITY TABLES

	1	2	3	4	5	6	7	8	9	10	11
Below 20	$0.70	....	....	....	....	....	....	....	$0.70	$0.73	....
20-20.9	.72	....	....	....	....	....	....	....	.72	.75	....
21-21.9	.74	....	....	....	....	....	....	....	.74	.77	....
22-22.9	.76	....	....	....	....	....	....	....	.76	.79	....
23-23.9	.78	....	$0.78	....	....	....	....	....	.78	.81	....
24-24.9	.80	....	.80	....	....	....	....	....	.80	.83	....
Below 25	....	$0.80	....	....	....	....	....	$0.80	....	....	$0.83
25-25.9	.82	.82	.82	....	$0.82	....	.82	....	.82	.85	.85
26-26.9	.84	.84	.84	....	.84	....	.84	....	.84	.87	.87
27-27.7	.86	.86	.86	....	.86	....	.86	....	.86	.89	.89
28-28.9	.88	.88	.88	$0.91	.88	....	.88	$0.88	.88	.91	.91
29-29.9	.90	.90	.90	.93	.90	....	.90	.90	.90	.93	.93
30-30.9	.92	.92	.92	.95	.92	....	.92	.92	.92	.95	.95
31-31.9	.94	.94	.94	.97	.94	....	.94	.94	.94	.97	.97
32-32.9	.96	.96	.96	.99	.96	....	.96	.96	.96	.99	.99
33-33.9	.98	.98	.98	1.01	.98	....	.98	.98	.98	1.01	1.01
34-34.9	1.00	1.00	1.00	1.03	1.00	$1.03	1.00	1.00	1.00	1.03	1.03
35-35.9	1.02	1.02	1.02	1.05	1.02	1.05	1.02	1.02	1.02	1.05	1.05
36-36.9	1.04	1.04	1.04	1.07	1.04	1.07	1.04	1.04	1.04	1.07	1.07
37-37.9	1.06	1.06	....	1.09	1.06	1.09	....	1.06	....	1.09	1.09
38-38.9	1.08	1.08	....	1.11	1.08	1.11	....	1.08	....	1.11	1.11
39-39.9	1.10	1.10	....	1.13	1.10	1.13	....	1.10	....	1.13	1.13
40 and above	1.12	1.12	....	1.15	1.12	1.15	....	1.12	....	1.15	1.15

NORTH TEXAS, WEST CENTRAL TEXAS, EAST CENTRAL TEXAS GRAVITY TABLES

	1	2	3	4	5	6	7	8
Below 20	....	....	....	....	$.80	....	....	....
20-20.9	....	....	....	....	.82	....	....	....
Below 21	....	....	....	....	....	$.81	....	....
21-21.9	....	....	....	....	.84	.83	....	....
22-22.9	....	....	....	....	.86	.85	....	....
23-23.9	....	....	....	....	.88	.87	....	....
24-24.9	....	....	....	....	.90	.89	....	....
Below 25	....	....	$.88	....	....	....	$.89	$.95
25-25.9	$.91	....	.90	$.97	.92	.91	.91	.97
26-26.9	.93	....	.92	.99	....	.93	.93	.99
27-27.9	.95	....	.94	1.01	....	.95	.95	1.01
28-28.9	.97	.97	.96	1.03	....	.97	.97	1.03
29-29.9	.99	.99	.98	1.05	....	.99	.99	1.05
30-30.9	1.01	1.01	1.00	1.07	....	1.01	1.01	1.07
31-31.9	1.03	1.03	1.02	1.09	....	1.03	1.03	1.09
32-32.9	1.05	1.05	1.04	1.11	....	1.05	1.05	1.11
33-33.9	1.07	1.07	1.06	1.13	....	1.07	1.07	1.13
34-34.9	1.09	1.09	1.08	1.15	....	1.09	1.09	1.15
35-35.9	1.11	1.11	1.10	1.17	....	1.11	1.11	1.17
36-36.9	1.13	1.13	1.12	1.19	....	1.13	1.13	1.19
37-37.9	1.15	1.15	1.14	1.21	....	1.15	1.15	1.21
38-38.9	1.17	1.17	1.16	1.23	....	1.17	1.17	1.23
39-39.9	1.19	1.19	1.18	1.25	....	1.19	1.19	1.25
40 and above	1.21	1.21	1.20	1.27	....	1.21	1.21	1.27

NORTH TEXAS, WEST CENTRAL TEXAS, EAST CENTRAL TEXAS TABLE EXPLANATION

COLUMN (1) WEST CENTRAL AND NORTH:
Humble Oil & Refining Co., 12-11-41, includes Brown, Callahan, Comanche, Eastland, Fisher, Haskell, Jones, Shackelford, Stephens, and Throckmorton counties.
Panhandle Refining Co., 12-11-41, in Leuders area.
Gulf Refining Co., 12-11-41.
Sinclair Prairie Oil Marketing Co., 12-11-41.

COLUMN (2) NORTH TEXAS:
Continental Oil Co., 12-11-41.
Magnolia Petroleum Co., 12-11-41.
Panhandle Refining Co., 12-11-41.
Bell Oil & Gas Co., 12-11-41.
Texas Co., 12-11-41.
COLUMN (3) EAST CENTRAL:
Magnolia Petroleum Co., 5-21-41, includes Cass, Panola, and Rodessa (Texas and Louisiana), and Miller County, Arkansas.

(Continued on Page 91)

STANDARD OIL CO. OF CALIFORNIA

CRUDE-OIL PRICES EFFECTIVE MAY 23, 1941

(All gravities above those quoted take highest price offered in that field)

Gravity	Signal Hill (Long Beach)	Wilmington	El Segundo	Seal Beach	Huntington Beach	Inglewood	Playa Del Rey	Olinda-Brea Canyon	Athens-Rosecrans	Torrance	Richfield	Whittier East Coyote (La Habra)	Montebello	West Coyote Hills	Santa Fe Springs	Greeley, Canal, Wasco	Coles Levee	Mountain View	Elk Hills, Buena Vista Hills, Midway-Sunset, Lakeview area	Lost Hills	Coalinga	Wheeler Ridge	Ketleman Hills	Elwood Terrace
14-14.9	....	$.68	....	....	$.71	....	....	$.70	....	$.70	$.70	$.70	$.72	....	....	....	....	....	$.73	$.73	$.73	....	....	....
15-15.9	....	.71	....	....	.75	$.76	....	.72	....	.72	.71	.72	.72	....	....	....	....	....	.73	.73	.73	....	....	....
16-16.9	....	.74	$.79	....	.79	.79	....	.75	....	.74	.73	.75	.72	....	....	....	....	....	.73	.73	.73	....	....	....
17-17.9	....	.78	.82	....	.82	.82	....	.78	....	.77	.76	.78	.72	....	....	....	....	....	.75	.78	.73	....	....	....
18-18.9	$.80	.82	.86	....	.86	.85	....	.81	....	.80	.79	.82	.74	....	....	....	....	....	.78	.81	.73	....	....	....
19-19.9	.84	.86	.90	....	.89	.88	....	.85	....	.83	.82	.85	.77	....	....	....	....	$.73	.81	.84	.75	....	....	....
20-20.9	.88	.90	.94	....	.93	.92	$.80	.88	....	.86	.85	.89	.80	....	....	....	....	.76	.85	.87	.77	....	....	....
21-21.9	.92	.94	.98	....	.96	.95	.84	.91	....	.89	.89	.92	.84	....	....	....	....	.79	.90	.90	.80	....	....	....
22-22.9	.96	.98	1.02	$.88	.99	.98	.87	.95	....	.93	.93	.96	.87	....	....	....	....	.83	.94	.93	.83	$.76	....	....
23-23.9	1.00	1.02	1.05	.92	1.02	1.01	....	.98	....	.97	.98	1.00	.91	....	....	....	....	.87	.99	.96	.86	.80	....	....
24-24.9	1.03	1.06	1.07	.97	1.05	1.04	f.o.b.	1.01	....	1.01	1.02	1.03	.94	$.99	....	....	....	.90	1.03	.99	.89	.83	....	....
25-25.9	1.07	1.09	1.10	1.01	1.08	1.07	our	1.04	....	1.05	1.06	1.07	.98	1.02	....	....	....	.94	1.07	1.01	.92	....	....	....
26-26.9	1.11	1.12	1.12	1.06	1.11	1.10	pipe	1.08	....	1.09	1.10	1.11	1.01	1.06	....	....	....	.97	1.11	1.04	.95	....	....	....
27-27.9	1.15	1.15	1.15	1.10	1.14	1.14	line	1.11	....	1.13	....	1.15	1.05	1.10	$1.04	....	....	1.01	1.15	1.07	.98	....	....	....
28-28.9	1.18	1.18	1.18	1.15	1.17	1.17	....	1.14	....	1.17	....	....	1.08	1.13	1.08	....	....	1.04	1.19	1.10	1.00	....	....	....
29-29.9	1.20	1.21	....	1.19	1.20	1.20	....	....	$1.17	....	....	....	1.12	1.17	1.12	....	....	1.07	1.24	1.13	1.02	....	....	....
30-30.9	1.23	1.24	....	..	1.23	1.22	....	....	1.21	....	....	....	1.15	1.21	1.15	$1.01	$1.09	1.10	1.28	1.16	1.04	....	....	f.o.b.
31-31.9	....	....	....	....	....	1.24	....	....	1.25	....	....	....	1.19	1.24	1.19	1.04	1.12	1.14	....	....	1.06	....	....	ship
32-32.9	....	....	....	....	....	....	....	....	1.29	....	....	....	1.23	1.28	1.23	1.07	1.14	1.17	....	....	1.09	....	....	....
33-33.9	....	....	....	....	....	....	....	....	1.32	....	....	....	1.27	....	1.26	1.10	1.17	....	....	....	1.11	....	....	$1.22
34-34.9	....	....	....	....	....	....	....	....	1.36	....	....	....	1.31	....	1.30	1.13	1.20	....	....	....	1.13	....	....	1.25
35-35.9	....	....	....	....	....	....	....	....	....	....	....	....	1.35	....	....	1.16	1.22	....	....	....	....	....	$1.23	1.28
36-36.9	....	....	....	....	....	....	....	....	....	....	....	....	1.39	....	....	1.19	1.25	....	....	....	....	....	1.26	....
37-37.9	....	....	....	....	....	....	....	....	....	....	....	....	1.43	....	....	1.22	....	....	....	....	....	....	1.29	....
38-38.9	....	....	....	....	....	....	....	....	....	....	....	....	1.47	....	....	1.25	....	....	....	....	....	....	....	....
39-39.9	....	....	....	....	....	....	....	....	....	....	....	....	1.51	....	....	....	....	....	....	....	....	....	....	....
40-40.9	....	....	....	....	....	....	....	....	....	....	....	....	1.53	....	....	....	....	....	....	....	....	....	....	....

Standard posts 73 cents for all grades at Newhall, Kern River, Kern Front, McKittrick and Round Mountain.

Personal Paragraphs

B. A. RAY, geologist of Midland, Tex., who recently resigned his position with Tide Water Associated Oil Co. to start a consulting practice, has accepted a position with Lario Oil & Gas Co., of Wichita, Kans., and will be its representative in charge of the West Texas and southeastern New Mexico division. GEORGE PUTNAM, chief geologist for Lario, will supervise opening the firm's Midland office.

HENRY E. LINAM, president of the Standard Oil Co. of Venezuela and general manager of the Lago Petroleum Corp., has resigned both positions.

THOMAS B. CAMPBELL, Cities Service Oil Co., has been promoted from first lieutenant to captain in the Army, and is stationed at Fort Riley, Kansas.

G. P. MIDDAUGH, for 12 years in the Chandler, Okla., office of Oklahoma Gas & Electric Co., has been made district accountant at Alva, Okla., for the firm.

PAUL W. FENTON, formerly purchasing agent for Tide Water Associated Oil Co., Tulsa and New York City, is now in the purchasing department of U. S. Rubber Co., under jurisdiction of the New York office.

WILLIAM A. GOFORTH, president of Valley Osage Oil Co., Tulsa, has returned to his home after spending some weeks at a Tulsa hospital, where he underwent an operation for a cataract on his eye.

J. J. BOYD, assistant chief engineer of Stanolind Pipe Line Co., discussed the designing of oil pipe lines at a conference sponsored by the Petroleum Engineers Club at Oklahoma University, Norman, last Friday. J. C. STIRLING, construction superintendent for Stanolind, discussed construction of lines and presented a colored film on a recent line.

DR. R. E. KING, geologist at Midland, Tex., for Shell Oil Co., Inc., for the past 6 years, has resigned to accept a position with Superior Oil Co. of California. His new duties will consist principally of surface-geology work in the trans-Pecos country of Texas and New Mexico. DR. R. R. WHEELER also is resigning from Shell, to act as Dr. King's assistant.

J. HOWARD FORRESTER, KARL P. WARWICK, ELMORE MEREDITH, J. E. MacALPINE and J. W. R. McLEOD have been elected directors of British Petroleums, Inc., of Vancouver, British Columbia.

FRANK G. EVANS, formerly research geologist for Shell Oil Co., Inc., in Houston, Tex., has been commissioned a lieutenant in the U. S. Navy Reserve and is taking a course in aerial navigation at the naval training school in Coral Gables, Fla. Upon completion of the course he will serve as an instructor in the school.

JOSEPH E. ELLIOTT, formerly manager of the industrial engineering department, Southwestern Gas & Electric Co., Shreveport, La., has been commissioned a captain in the U. S. Army Engineers Corps and is now on duty at Camp Claiborne, Louisiana.

W. A. MARTIN has been appointed division land man of Texas Co., covering Oklahoma, Kansas, Illinois, and Indiana, succeeding J. E. FLANAGAN, who retired from active service December 1. Mr. Martin has been with the company since 1917, when he became land man at Ardmore, Okla. C. C. VIRGIN has been placed in charge of the company's land department at Mattoon, Ill., taking the post formerly held by Mr. Martin. PAUL M. YOUNGMEIR, who has been assistant land man for Illinois, has been transferred to Wichita, Kans., to head the land department for that state, and DON WITT, formerly of Wichita, is now Mr. Martin's assistant in Tulsa.

Do You Remember?

From The Oil and Gas Journal Files

40 YEARS AGO (1902)

The charter of Beaumont Refining Co. of Beaumont, Tex., capital stock $200,000, has been filed with the secretary of state. The purpose of the company is the refining of crude petroleum and manufacture of byproducts thereof.

The coming in of what are affectionately called "old-time gushers" has recently become so frequent on Spindletop that they cease to cause a stir. The gushing affords proof that the field is still strenuously in the producing business.

A new-style locomotive tender, designed to carry both oil and water in large quantities, has just been built by Southern Pacific Railroad at its Sacramento, Calif., shops, as an experiment.

25 YEARS AGO (1917)

Nelson K. Moody, vice president and general manager of Prairie Oil & Gas Co., with headquarters at Independence, Kans., has been selected as manager for a Red Cross membership campaign inaugurated at Independence.

Blackwell, Okla., is enjoying oil prosperity. All wooden buildings in the business section are to be razed and brick or other fireproof structures are to take their places. The town is booming and spreading out.

It is announced that Sinclair Gulf Corp. is speeding up preliminary activities for the construction of a 6-in. pipe line from Healdton, Okla., to Houston, Tex. Right-of-way work is now in progress.

10 YEARS AGO (1932)

Midland Gasoline Corp. is dismantling its Coleman, Tex., plant and is moving the absorption equipment to the Conroe field, Gulf Coast. Compressors at Coleman will not be moved at this time.

Reorganization of Cosden Oil Co. has been completed and it is now planned to lift the receivership about January 1. J. S. Cosden, founder of the company, will head the new organization.

Richmond Petroleum Co., a Mexican subsidiary of Standard Oil Co. of California, is reported to be completing plans for the construction of a refinery across the bay from Puerto, Mexico. Validity of titles is now being established.

T. H. CARTER, auditor for Atlantic Oil & Refining Co., at the Dallas, Tex., office, is now an ensign in training at Cornell University, Ithaca, N. Y.

JACK CAMPBELL, a former employe of Texas Co., who was in one of the Japanese invasion areas of China, has been reported alive and well, and is expected to return to Canada shortly.

GEORGE O. SUMAN, production superintendent of Tide Water Associated Oil Co. with offices at Oildale, Calif., has been elected chairman of the San Joaquin Valley chapter of the A.P.I. for 1943.

VAL T. BILLUPS, formerly district land agent for Shell Oil Co., Inc., in Tyler, Tex., has been made vice president of Texas Gulf Producing Co. in Houston, Tex. He is succeeded in Tyler by H. W. SHARP.

REESE H. TAYLOR, president of Union Oil Co., has been reelected director of the Federal Reserve Bank and will represent banks having capital assets between $150,000 and $1,000,000. His new term of office begins in 1943 and runs for 8 years.

MAURICE A. BREWSTER, vice president and treasurer of Pennzoil Co., Oil City, Pa., has enrolled in the institute of federal taxation at New York University, which is scheduled to meet for a 10-day session early this month to discuss details of the new federal tax law.

JOHN W. ORR was presented with the Meritorious Safety Award, one of the most distinguished medals given by Phillips Petroleum Co., last week, at a Borger, Tex., refinery safety meeting. The award was made by HUGH MILLER, of Bartlesville, Okla., general superintendent of Phillips refineries. Mr Orr earned the medal by saving the life of John Lees, at Monument Lake, Colo.

THOMAS A. J. DOCKWEILER, a resident of Los Angeles, Calif., and prominent in law and business circles on the Pacific Coast as well as being counsel for several oil companies, has been elected a member of the board of directors of Tide Water Associated Oil Co., succeeding the late George N. Armsby.

J. D. PHILLIPS, of Peoria, Ill., is the newly appointed district marketing manager at Wichita, Kans., for Phillips Petroleum Co., succeeding E. H. LYON, who after January 1 will go to Bartlesville, Okla., where he will assume special duties in the general sales department of the organization.

E. H. MOORE, Tulsa oil man and senator-elect, will resign his position as chairman of the general salvage section for Oklahoma at the end of the year. At the same time he will resign from the state's "Santa Claus" commission, which plans Christmas parties for state orphanages.

DON T. ANDRUS, Bradford, Pa., independent operator, and WILLIAM SHOEMAKER, Forest Oil Corp., Bradford, have been named to the executive committee of the National Stripper Well Association for the coming year. They will represent the Bradford district, Pennsylvania Oil Producers Association, on the committee.

J. W. RAYBORN, Tide Water Associated Oil Co., Tulsa, has been nominated for another term as president of the Petroleum Motor Transport Association of Oklahoma. HOMER NEWBY, Cities Service Oil Co., has been nominated for first vice president; C. E. JACKSON, Mid-Continent Petroleum Corp., for second vice president, and W. H. ESSOR, Shell Oil Co., Inc., for secretary-treasurer.

Finishes 40 Years

Herbert F. Miller, who began his business career as a messenger boy with Standard Oil Co., New York, at 26 Broadway, last week completed 40 years of service with Carter Oil Co. and its parent company. The occasion was celebrated with a dinner at which the directors of the company honored him, and presented him with a 40-year service pin. Presentation was made by L. F. McCollum, president of Carter.

HERBERT F. MILLER

Mr. Miller is a native of Brooklyn, N. Y. He was 16 when he got that job as messenger boy. He studied shorthand at night, and in 1909, when Walter C. Teagle sailed for Europe in connection with the company's export business, Young Miller accompanied him as secretary. This was the first of many trips to foreign lands the young man was destined to make.

Mr. Miller was sent to Tulsa in 1921 to report market conditions and to purchase gasoline and other oil products. When Carter created its marketing department 10 years ago, Mr. Miller was placed in charge, with offices in Tulsa. He has held this position ever since. In 1935 he was named a director of the company. He still handles all purchases and sales of crude, casinghead gasoline, liquefied petroleum gases, lubricating oils, and greases.

Mr. Miller married Miss Martha Davidson, of Little Falls, N. Y. He and Mrs. Miller live in Tulsa with their three sons. He confesses that he is not addicted to golf, and that he has never learned to enjoy bridge.

DAVID L. CLANTON, who was assistant shooter in a seismograph crew for Shell Oil Co., Inc., and who volunteered for army service in March 1941, has had a series of promotions and now is a second lieutenant at Fort Oglethorpe, Ga.

TOMMY McDONNELL, Sunray Oil Co., Oklahoma City, Okla., division, has enlisted with the Seabees, and WELDON TALIAFERRO, also of Sunray, has reported to the Red River Ordnance Depot, near New Boston, Tex.

R. S. KNAPPEN, assistant to the vice president of Gulf Oil Corp., will be appointed by Mayor C. H. Veale to the Tulsa Public Library board, replacing DR. B. B. WEATHERBY, president of Geophysical Research Corp., who has resigned due to press of war work. Mr. Knappen is a member of the American Association of Petroleum Geologists, the Geophysical Society of America, and other oil-affiliated organizations.

DAVID E. CRAWFORD has been elected a director of South Penn Oil Co. to succeed the late Thomas B. Judge. Mr. Crawford also was elected comptroller of South Penn Oil Co. and South Penn Natural Gas Co. He has been located at Parkersburg, W. Va., as treasurer of South Penn Natural Gas Co., but will move to Pittsburgh, Pa. E. W. KARTLICK was elected treasurer of South Penn.

HOMER HATFIELD, of Mid-Continent Petroleum Corp., Shawnee, Okla., was elected president of the Oklahoma Oil Scouts Association, at a meeting held in Shawnee. HOWARD STARNS, of Shell Oil Co., Inc., Ardmore, is new vice president, and M. W. HOWARD, with Carter Oil Co., at Seminole, was reelected secretary. G. W. SABERLINE, with Sun Oil Co., at Shawnee, will edit the Oklahoma sector in the scouts' national yearbook.

J. HOWARD PEW, president of Sun Oil Co., was elected a director at large, and JOHN R. SUMAN, vice president of Humble Oil & Refining Co., was elected state director for Texas at the annual meeting of the National Association of Manufacturers in New York last week. W. S. S. RODGERS, president of Texas Co., was continued in office as a director.

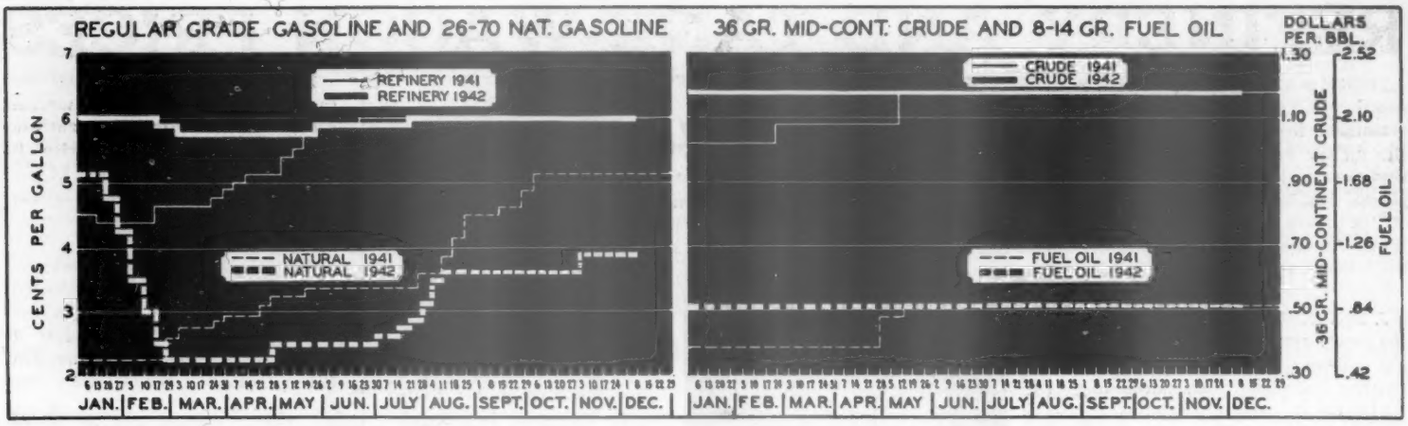
R. A. BROOMFIELD, JR., and W. A. BROOMFIELD, sons of R. A. BROOMFIELD, who retired last year as executive vice president of Barnsdall Oil Co. but who is back in harness again for the duration, are both in the military service. Bud, who resigned last year as vice president of Barnsdall to enter military service, is attached to the tenth station complement at McClellan field, Sacramento, Calif., and Bill is captain in the 826th Tank Destroyer Battalion.

R. R. THOMPSON, chief geologist for Danciger Oil & Refining Co. at Fort Worth, Tex., for the past 13 years, has resigned to accept a position with Snowden & McSweeney Co., with headquarters in Fort Worth. He will be in charge of the geological department. PAUL L. APPLIN, consulting geologist in Fort Worth for 12 years, has joined Danciger in the post vacated by Mr. Thompson. Prior to joining Danciger, Mr. Thompson was head of the geological department of Texas Pacific Coal & Oil Co.

Shifts: J. W. HODGES, engineer, Sun Oil Co., Sweeny, to Beaumont, Tex.; ROBERT J. GUTRU, geologist, Cities Service Oil Co., Great Bend, Kans., to Milwaukie, Ore.; L. B. STABLEFORD, president, Allied Pipe Line Corp., Memphis, Tenn., to Chicago; C. L. WITHERS, superintendent, Allied Pipe Line Corp., Memphis, Tenn., to Chicago; C. F. BRAZELL, engineer, Joseline Production Co., Okemah, Okla., to Compton, Calif.; A. T. GLOVER, superintendent, Magnolia Pipe Line Co., Oklahoma City, Okla., to Dallas, Tex.; R. C. MASON, superintendent, Phillips Petroleum Co., Bivins to Pampa, Tex.; LEON KERNS, engineer, Wiser Oil Co., Copley to Brunswick, Ohio; S. I. BETZER, engineer, Phillips Petroleum Co., Bartlesville to Ponca City, Okla.; J. H. PLATTS, engineer, Phillips Petroleum Co., Webb City to Bartlesville, Okla.; L. L. MALAISE, superintendent, Atlantic Pipe Line Co., Merryville, La., to Longview, Tex.

J. V. McGOODWIN, research economist for Humble Oil & Refining Co., served as executive organizer in handling the huge stacks of applications for supplemental-ration books in Houston, Tex., before the December 1 deadline. He was right-hand man to C. J. CRAMPTON, emergency czar of gasoline rationing, directing the work of 600 volunteers who devoted the closing days of November to a whirlwind campaign to avoid a breakdown of transportation in Houston and Harris County.

JULE R. SMITH, of Henderson, Tex., who has just been promoted from major to lieutenant colonel, was in the proration department of Humble Oil & Refining Co. in Houston, Tex., 18 years. He was commissioned major 3 years ago. A veteran of World War I, Colonel Smith was called into service with the 124th Cavalry in November 1940. In December 1941 he was placed on detached service to take charge of plans for protection of the industrial area and blackouts along the Gulf Coast. He is stationed at Fort Brown. When the East Texas oil field was under martial law 10 years ago Colonel Brown, then a first lieutenant and adjutant, was promoted to captain.



MARKET DEVELOPMENTS . . .

East Coast

NEW YORK.—The oil supply situation in the Northeast became increasingly critical this week when it developed that supplies of kerosene in the Boston area were virtually exhausted in face of a rising demand.

An almost similar situation with respect to industrial fuel oil prevailed in the New York Harbor region and the advisability of diverting light fuel oil to purposes normally supplied by heavy fuel is under consideration.

Heating oil is in the best shape of all major products. This condition may be attributed to the fact that the weather so far this fall has been milder than normal. Up to late November the number of degree days was calculated at 807 for New York City against a normal of 900.

Stocks of gasoline are reported to be from 35 to 40 per cent less than they were a year ago.

In order to further reduce the demand for oil in District 1 another reduction in heating oil rations, now limited to 66 per cent of normal, is contemplated.

Mid-Continent

MOTOR-FUEL offerings in the interior spot market this week continued scarce despite the lull in activity that immediately followed inauguration of rationing. Refiners and marketers alike awaited more conclusive developments in the demand outlook before taking a definite position.

Retail buying of gasoline virtually ceased during the first week of December, reflecting the universal practice of motorists in filling their supply tanks to the brim. At the start of this week, however, retailers reported a return of customers and were again calling on suppliers for deliveries. Furthermore, local rationing boards are just now working through applications for supplemental fuel, many of which were honored.

Refiners indicated that long-term contracts and shipping instructions issued before rationing started aggregated sufficient business to absorb December production.

Numerous manufacturers, anticipating imposition of nation-wide rationing several months ago, started deliveries in December against eastern contracts. However, the most urgent calls from distributors in the East, as well as in the Middle West, were for various grades of burning oils.

Developments of the week, including the directive issued to railroads to make necessary tank-car repairs at the maintenance point nearest the breakdown, revived refiners' hopes that overland movements to all consuming centers may be increased and thus cushion the reaction from rationing.

Prices for all products were steady at levels prevailing a week ago and refiners generally reported that they are in position to add moderate amounts of all materials to stocks.

SENTENCE SUMMARIES

MID-CONTINENT: Product prices steady. Refiners await conclusive evidence on trend of demand. Calls for fuel oils growing more urgent.

GULF COAST: Suppliers hear unconfirmed reports of decisions to assign more tankers to coastwise service.

EAST COAST: More stringent rationing recommended. Area facing more acute shortages, unless tankers are utilized more extensively.

PACIFIC COAST: Spot trading disappears with rationing. Considered temporary condition. Fuel scarce, purchasers active.

PENNSYLVANIA: Lubricating oil demand crowds refiners to fulfill commitments. Spot offers rejected by most suppliers.

Gulf Coast

HOUSTON, Texas.—The Gulf Coast refinery market presented a somewhat confused picture this week. Storage tanks were full of products and the transportation problem was increasingly acute but there was no sign of price-cutting and little talk about distress stocks. Although the situation was conducive to irritation, comments in the trade were for the most part good-naturedly optimistic. One reason for the cheerful view lay in reports, impossible of positive confirmation, that tankers had been allocated to the East Coast to relieve congestion at the Gulf and give eastern areas much needed fuel-oil supplies. Brightening the outlook too was an apparent improvement in export movement. Approaching completion of the "big inch" pipe line, which will remove bulging stocks of gas oil from this region, was another favorable factor.

Ultimate effects of gasoline rationing were not yet wholly clear. Reports indicate that many motorists laid in supplies of gasoline right up to the December 1 deadline. "They used everything but the dishpan," declared one man familiar with conditions. These supplies cannot last long, however, and already automobile traffic is showing the effects of rationing. A count revealed a decline of 20.5 per cent in the number of cars leaving the business district of Houston in the afternoon hours.

Many filling stations are closing, gasoline sales under the rationing system being too small to yield a profit. This announcement appeared at one station: "War on, business off. Gone to war. For Sale."

Applicants for supplemental rationing books seem to be having no difficulty in getting them. In fact, the ease with which they are obtained has created a feeling that rationing boards in oil-producing areas have been advised to be as generous as possible.

Pacific Coast

LOS ANGELES, Calif.—Sharp reaction was apparent this week, the start of nation-wide rationing, after distribution facilities were taxed to the limit at the end of November. The lull in demand hit refiners as well as retail outlets. Tank-car shipments at refineries were less affected because of the stock-replenishment orders but spot-market trading was at a minimum pending more conclusive information on ability of the market to resist lower consumption.

Demand for fuel oil during October, the latest California data available, averaged 370,000 bbl. daily and is expected to hit the 400,000-bbl. mark in the next few months. Marketers are anxious to expand present stocks of fuel oil but refiners are offering little for open trading and consequently prices and movement are following routine lines. There is practically no gas oil available at any price. Marketers are willing buyers of all offerings.

There is a distinct shortage of natural gasoline. Lower requirements for winter-gasoline blends may tend to bring supply and demand in balance but the forward purchases do not indicate any particular decline in requirements.

A.P.I. REFINERY REPORT

Week Ended November 28, 1942

(Figres in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Residual	Gas oil
Appalachian	162	2,549	387	761
Ind., Ill., Ky.	747	13,467	2,449	6,330
Okla., Kans., Mo.	372	5,996	1,438	2,043
Censored area*	1,639	37,785	17,271	27,224
Rockies	89	1,481	600	423
California	727	17,576	55,651	12,958
Total Nov. 28, 1942	3,736	78,854	77,796	49,739
Total Nov. 21, 1942	3,722	78,583	77,012	49,541
Total Nov. 29, 1941	4,145	86,889	94,817	55,251

Note: Refinery runs and stocks for week ended December 5, 1942, appear on Trends page.

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas as request of OPC.

CRUDE-OIL STOCKS

(Bureau of Mines estimate)

Week ended:	Bbl. of crude*
November 28, 1942	234,850,000
November 21, 1942	235,305,000
November 29, 1941	242,884,000

*Excludes heavy, unrefinable stocks in California.

REFINERY AND TANK-WAGON PRICES

(Prices as of December 8)

Refinery Gasoline

Octane (A.S.T.M.):	†80	78	74-76	72-74	68-70	63-66	60 & lower
Mid-Continent*				5.875-6.000		5.500-5.625	5.125-5.250
Pennsylvania			6.750-7.000				
Gulf Coast‡	6.00-6.50				§5.750-6.250	§5.250-5.750	§5.000-5.500
Northeast Coast	9.80			9.2	9.2		
Pacific Coast		6.500-7.000	6.250-6.500	6.125-6.250	5.750-6.000	5.125-5.250	4.750-5.000

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon lubricating oils, and do not include marine lighterage charges.

Natural Gasoline

Grades:	26-70	18-55	75-85(350-375)
Oklahoma (Group 3)	3.875	4.650	
North Texas	3.500	4.200	
North Louisiana	3.625	4.350	
California			4.875-5.500

Kerosene and No. 1 Fuel Oil

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*			4.500	4.375	
North Louisiana				4.500-4.750	
Pennsylvania	6.250-6.625	6.125-6.250			
California				4.500-5.500	4.250
Northeast Coast				6.80	
Gulf Coast				3.875	

*Basis Oklahoma Group 3.

Tractor, Diesel, and Bunker Fuel Oil

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Bunker C
Mid-Continent*	4.125					
California		2.750-4.000			‡$1.35-1.45	$0.85-0.90
Gulf Coast			4.000	4.125	1.45	0.85
Northeast Coast				6.800	2.780	1.65
North Louisiana						†0.80-0.85

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200.

Furnace Oil, Gas Oil, Fuel Oil

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625-3.750	3.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	
Northeast Coast	6.7	6.7	1.95	1.65
Pacific Coast	5.5	5.5	‡0.80-95	§0.80
Gulf Coast	3.875-40		1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel oil. ‡Pacific Specification 300. §Pacific Specification 400.

Lubricating Oils

Bright and Steam Refined

OKLAHOMA (Group 3)—	
200-210 D, 10-25	27.00
150-160 D, 0-10	23.00
120-125 D, 0-10	22.00
Steam refined:	
600 dark green (untreated)	9.00
PENNSYLVANIA—	
Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):	
10 pour point	30.50
15 pour point	29.50
25 pour point	25.00
Steam refined:	
600	15.00
650	15.50
600 flash	16.00
630 flash	17.00

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—	
0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Wax

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inlcnd refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250

Neutral Oil

CALIFORNIA—		
Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25
GULF COAST—		
Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50
PENNSYLVANIA—		
150 vis. at 70° F., 3 color, 400-405 flash:		
Zero pour point		37.50
10 pour point		36.50
15 pour point		35.50
25 pour point		30.00
200 vis. at 70° F., 3 color:		
Zero pour point		39.50
10 pour point		38.50
15 pour point		37.50
25 pour point		32.00
NEW YORK—		
Wax in bags fully refined:		
130-132 (A.m.p.) wax		5.850
133-135 (A.m.p.) wax		6.150
Crude scale:		
124-126 (A.m.p.) w.s.		4.250
124-126 (A.m.p.) y.s.		4.250

EXPORT PRICES

Gasoline—60-62° Gravity, Maximum 400 End Point

Octane:	72-74	68-70	65-66	60
Gulf Coast	6.050	6.250-6.500	5.875	5.625
Pacific Coast		6.125-6.500	5.875-6.000	5.500-5.625

Distillate and Fuel Oil

	Kerosene	Diesel fuel				Bunker
	41-43	24 G.	48-52 D.I.	58 D.I.	Bunkers	C grade
Gulf Coast	4.000-4.250		4.125-4.375	4.375	$1.65-80	$0.85-95
Pacific Coast	4.750-5.000	1.25-30			†1.35-45	*0.80-90

*Pacific Specification 400. †Pacific Specification 200.

Lubricating Oils

	Neutral oils		Bright and cylinder stocks		
	200-3	150-3	200-3	150-3	600&630 S.R.
Mid-Continent	16.8	....	28.8	24.8	....
Pennsylvania	43-50	41-46	36-37	36-37	26.5-27

GASOLINE AND KEROSENE TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades. tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Baltimore, Md.	15.45	5.50	10.20
Boston, Mass.	14.90	4.50	9.50
Burlington, Vt.	16.90	5.50	....
Buffalo, N. Y.	16.20	5.50	10.30
Dover, Del.	16.70	5.50	11.20
Hartford, Conn.	15.60	4.50	....
Manchester, N. H.	17.30	5.50	10.50
Newark, N. J.	14.70	4.50	9.40
New York, N. Y.	16.10	5.50	9.50
Philadelphia, Pa.	16.20	5.50	11.65
Pittsburgh, Pa.	16.70	5.50	12.00
Portland, Me.	16.30	5.50	9.60
Providence, R. I.	15.00	4.50	9.30
Washington, D. C.	14.70	3.50	10.70
Average 14 cities	15.91	5.07	10.32

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Chicago, Ill.	13.40	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Atlanta, Ga.	21.40	7.50	11.40
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.45	7.50	....
Charleston, W. Va.	18.75	7.50	13.00
Charlotte, N. C.	19.60	7.50	11.00
Jacksonville, Fla.	21.40	8.50	10.40
Jackson, Miss.	17.50	7.50	8.50
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	18.60	8.50	10.50
New Orleans, La.	16.75	8.50	*10.00
Norfolk, Va.	16.95	6.50	10.50
Average 11 cities	18.58	7.59	10.00

*Includes 1-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.80
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	18.00
Phoenix, Arix.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.00
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.50
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.50
Average 3 cities	16.17	5.83	12.83
Average 50 cities	16.57	5.96	10.76
Average last week	16.57	5.96	10.76

CRUDE-OIL PRICES

(Continued from Page 87)

Gulf Refining Co., 5-21-41, includes Rodessa, Texas.

COLUMN (4) EAST CENTRAL:
Humble Oil & Refining Co., 5-21-41, includes Anderson, Cherokee, Limestone, and Navarro counties and the Navarro Crossing field.

COLUMN (5) EAST CENTRAL:
Humble Oil & Refining Co., 5-21-41, includes Hawkins field.

COLUMN (6) NORTH TEXAS:
Stanolind Oil Purchasing Co., 12-11-41.

COLUMN (7) FISHER COUNTY:
Shell Oil Co., Inc., 12-11-41.

COLUMN (8) MEXIA:
Sinclair Prairie Oil Marketing Co., 5-30-41.

TEXAS FLAT-PRICE FIELDS

Agua Dulce (light), Benavides, Longhorn, Southland, and Sweden, 5-21-41 ..... $1.35
Agua Dulce (heavy), 10-16-41 ..... $1.25
Republic Oil Refining Co., 5-21-41.

Alfred and Magnolia City $1.35
Continental Oil Co., 5-21-41.

Alice, Benavides (North Sweden), Ben Bolt, Clark-Mull, Sun, and Tom Graham $1.35
Humble Oil & Refining Co., 5-21-41.

Batson (new), Humble (35° and above), Fig Ridge, Hardin, Hull (25° and above), La Belle, North Dayton (25° and above), Seabreeze South China, West Orange, Willow Slough and Oyster Bayou ... $1.25
Sun Oil Co., 5-21-41.

Cass County $1.20
Texas Co., 5-21-41.

Cayuga, Anderson County $0.90
Pan American Production Co., 5-21-41.

Chapel Hill, Smith County:
Crude distillate $1.30
Crude oil 1.18
Chapel Hill Gas System, 11-7-41.

Clay Creek, Washington County ... $1.00
Sun Oil Co., 5-21-41.

Cleveland, Liberty County $1.26
Magnolia Petroleum Co., 5-21-41.

Conroe, Montgomery County $1.43
Humble Oil & Refining Co., 5-21-41.
Tide Water Associated Oil Co., 5-21-41.
Sun Oil Co., 5-21-41.
Texas Co., 5-21-41.

Cotton Lake (South) $1.35
Sun Oil Co., 5-21-41:

East Texas and Flag Lake* $1.25
**Humble Oil & Refining Co.*, 5-21-41.
Pan American Production Co., 5-21-41.
Tide Water Associated Oil Co., 5-21-41.
Gulf Refining Co., 5-21-41.
Magnolia Petroleum Co., 5-21-41.
Sinclair Prairie Oil Marketing, 5-21-41.
Shell Oil Co., Inc., 5-20-41.
Sun Oil Co., 5-21-41.
Texas Co., 5-21-41.
Stanolind Oil Purchasing Co.

Esperson (35° and above), South Esperson $1.30
Sun Oil Co., 5-21-41.

Flour Bluff, East Flour Bluff $1.33
Humble Oil & Refining Co., 5-21-41.

Hockley and Cochran $0.87
Texas Co., 5-21-41.

Livingston and Mercy $1.25
Shell Oil Co., Inc., 5-20-41.

Long Lake $1.23
Sinclair Prairie Oil Marketing, 5-21-41.

Luby $1.35
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Luling $1.05
Magnolia Petroleum Co., 5-21-41.

Lytton Springs $1.17
Magnolia Petroleum Co., 5-21-41.

Salt Flat, North Salt Flat, Darst Creek*, Hilbig, Clark, Carroll, and Zoborski $1.14
Humble Oil & Refining Co., 5-21-41.
Magnolia Petroleum Co., 5-21-41.
**Texas Co.*, 5-21-41.

Rincon (North), Sun, North Sun and Garcia $1.35
Sun Oil Co., 5-21-41.

Yturria $1.45
Sun Oil Co., 3-19-42.

Talco $0.79
Humble Oil & Refining Co., 5-21-41.
Magnolia Petroleum Co., 5-21-41.

Tomball and Satsuma $1.40
Humble Oil & Refining Co., 5-21-41.
**Magnolia Petroleum Co.*, 5-21-41.
Stanolind Oil Purchasing Co., 4-1-41.

Van, Van Zandt County $1.08
Humble Oil & Refining Co., 5-21-41.
Pure Oil Co., 5-21-41.

Yates (regular) $0.95
Humble Oil & Refining Co., 5-21-41.
Gulf Refining Co., 5-21-41.
Shell Oil Co., Inc., 5-20-41.

Yates (shallow) $0.83
Shell Oil Co., Inc., 5-20-41.

California Fields

(Continued from Page 70)

week by completing 1 Sesnon in 28-3n-16w flowing 2,400 bbl. of relatively clean 23.1-gravity oil and 1,300,000 cu. ft. of gas per day from the lower Porter zone of Miocene age. This well was originally tested out in the upper zone, from which depth it only produced about 100 bbl. per day and a considerable amount of gas. The well was accordingly deepened to its present depth, 9,086 ft., and returned to production as an exceptionally good well. Completion of this well, which was brought in flowing through a 48/64-in. bean, proves up several additional locations for Tide Water Associated Oil Co. The new producer, 1 Sesnon, is owned jointly by Tide Water Associated Oil Co. and Standard Oil Co. Aliso Canyon, although badly broken up structurally and with very rough topography, is proving to be an important producing area and will substantially increase crude-oil reserves of Tide Water Associated Oil Co., which to date has been the only operator to develop commercial production within the field's limits. Union Oil Co. and Standard Oil Co. each drilled a dry hole along the northern boundary of the field, but Tide Water Associated later developed a deep zone and this might later prove to be productive along the south boundary of Standard's former lease and Union's Orcutt lease. The zone, formerly known as the Porter 12 zone because it was first found in 12 Porter of Tide Water Associated Oil Co., will probably be known in the future as the Sesnon zone as there are already two or three zones in the field known as the Porter zone.

COASTAL DISTRICT COMPLETIONS

Aliso Canyon, Los Angeles County: Tide Water Associated Oil Co. 1 Sesnon, 28-3n-16w, flowed 2,400 bbl., 23.1-gravity, 1 per cent cut, 1,300,000 cu. ft. of gas, 48/64-in. bean, flow pressure 400 lb., T.D. 9,086 ft., perf. 8,883-9,081 ft., extends field ½ mile west, drilled jointly with Standard Oil Co.

Newhall Potrero, Los Angeles County: Barnsdall Oil Co. 21 Rancho San Francisco, 27-4n-17w, flowed 985 bbl., 33.5-gravity, T.D. 7,550 ft., perf. 7,328-7,511 ft. completed in third Modelo zone of Miocene age.

Fourth Turnbull Canyon Well Making Good Producer

Continental Oil Co. appears to have the makings of a good well in the Turnbull Canyon field of Los Angeles County, and this potential producer should be tanking oil before the close of another week. Continental's 4 Turnbull Community was making hole at 3,820 ft. and still in exceptionally good-looking oil sand. On the basis of showings to date this should be the best well finished at Turnbull Canyon although there is no way of making an estimate until oil is actually running into tanks. Continental's 4 Turnbull Community is the most westerly hole in the field and should prove up several additional locations if it shows large production. Out of three wells drilled in this field, two have been pumpers and one was brought in under a natural flow. These three wells have limited the outer margin of production in three directions, namely to the north, east and south.

Buena Park

The outlook at Buena Park in Orange County where Texas Co. found a new accumulation several months ago is not as bright as Turnbull Canyon. The economic importance of the Buena Park accumulation has not yet been determined although present indications point to the probability that it will be of little significance. Texas Co. is at present drilling ahead in 4-1-F Buena Park at 9,550 ft. A small amount of poor-looking oil sand has been cored higher up in the hole, but it is doubtful whether it will prove commercially productive. It is interesting to note in this connection, however, that although the discovery well did not look any too hot, the company succeeded in developing small production. The present well is the fourth to be drilled by Texas Co. at Buena Park and the result is two small wells. The lowest well structurally proved to be the best well in the field and the highest well structurally did not contain enough oil sand to produce anything and was abandoned. The present well, 4-1-F Buena Park, is half way between the two producers but is north of a straight line bebetween the two wells. The results of drilling at Buena Park to date are rather discouraging and it would not be at all surprising if the area were abandoned if the present well fails to result in commercial production.

LOS ANGELES BASIN COMPLETIONS

Montebello, Los Angeles County: Standard Oil Co. 94 Baldwin, 1-2s-12w, pumped 151 bbl., 15.4-gravity oil and 52 bbl. of water, T.D. 3,000 ft., perf. 2,497-3,000 ft., completed in La Merced zone of Pliocene age.

Wilmington, Los Angeles County: Texas Co. 6 Refinery fee, 34-4s-13w, pumped 36 bbl., 16.5-gravity, 5 per cent cut, T.D. 3,436 ft., perf. 3,287-3,433 ft., completed in Ranger zone of Pliocene age.

La.-Arkansas Fields

(Continued from Page 82)

R. A. Stacy 2 Hunt-Garrett, NE SW 8-23n-8w, flowed 182 bbl. in 6 hr., Pettit 5,462-70 ft., 5,514-24 ft., T.D. 5,570 ft.

Hosston, Caddo Parish: Bayou State Oil 11-B Jolley, SE NW SE 21-22n-15w, pumped 5 bbl., T.D. 1,027 ft.

Bayou State Oil 12-B Jolley, SW NW 21-22n-15w, pumped 3 bbl., T.D. 1,037 ft.

ARKANSAS COMPLETIONS

Wildcat, Hempstead County: Barnsdall 1 Shultz, SW NE 20-14s-25w, dry, T.D. 6,101 ft., Travis Peak 3,816 ft., Cotton Valley 4,615 ft., Buckner 5,680 ft., Smackover 5,948 ft.-6,017 ft.

Wildcat, Calhoun County: Skelly 1 Callon Lbr. Co., NE SE 27-15s-14w, dry, T.D. 4,980 ft., Travis Peak 2,928 ft., Cotton Valley 3,270 ft., Buckner 4,800 ft.

Stephens County, Columbia County: R. H. Crow 1 Taylor, SW NE 12-15-20w, pumped 20 bbl., Smart sand 3,474-81 ft., T.D. 4,055 ft.

Nebraska Fields

(Continued from Page 83)

mark as the week closed. Cities Service 1 Jim Cook in NW NW NW 32-65n-39w, in Atchison County, Mo., about 4 miles southeast of Tarkio, was to be drilled into the Bartlesville sand, but completion was delayed. Pipe was cemented at a depth reported at 1,442 ft. and plug was to be drilled with cable tools. The company is believed to have had a show of oil in the Bartlesville sand. There was a show in the sand at 1 Gray, one location north, but too much water came in when a test was made.

Richardson County, Nebraska, had a new test starting. R. L. Ferguson and Edwin S. Towle of Falls City were preparing to drill 1 Catherine Tiehen, NE NW 24-1n-17e, 1 mile southwest of Rulo, in the southeast part of the county. This is a farmout from the Carter Oil Co.

Indiana Fields

(Continued from Page 80)

SW SE 29-6s-11w, dry, T.D. 1,850 ft., Waltersburg sand 1,788 ft., show oil 1,795 ft.

WESTERN KENTUCKY

OWENSBORO, Ky. — Six producers were completed last week in the active Smith Mills pool in Henderson County with an average production of 450 bbl. on the pump. The pay in this pool is the Cypress sand, found around 2,300 ft. Showings have been found in the Hardinsburg at 2,050 ft.

CANADIAN FIELDS

Devonian Test Started in Turner Valley Field

By VICTOR LAURISTON

CHATHAM, Ont.—Crude and natural-gasoline production from all Alberta fields for the week ending November 23 averaged 26,978 bbl. daily compared with 27,935 bbl. daily for the previous week and 28,900 bbl. daily for the corresponding week last year. The daily average included 25,620 bbl. of crude and 795 bbl. of natural gasoline from Turner Valley and 563 bbl. of crude from outside fields.

In the northern part of west-central Turner Valley, Devonian Test 1, LSD 2, 25-19-3w5 was spudded in last week. This is a first effort, sponsored by a group of Turner Valley companies, to drill to the Devonian limestone, underlying the Madison which was heretofore been the main source of crude and naphtha in the Turner Valley field. The location was carefully selected with a view to avoiding the faulting encountered in some portions of the field and entering the Devonian at a reasonable depth. No previous Turner Valley test has reached the Devonian formation, although McLeod Oil, some 4 years ago, drilled into the Banff shales, which normally separate the Madison and Devonian formations. If production is secured in the Devonian at commercial depth, it will probably result in the deepening of some of the older Turner Valley producers as well as considerable new drilling.

Vermilion Field

In the Vermilion field, eastern Alberta, the Canadian National Railways, following negotiations with the Alberta government and the federal oil controller, is undertaking a program of systematic development for fuel-oil purposes. Upwards of 600 acres, representing locations for 60 wells, have been acquired in what is practically proven territory, and it is reported 7,000 acres in outlying areas have been optioned. A number of Alberta contractors have been asked to submit tenders for drilling. Preliminary operations are being handled from Calgary. A new subsidiary company, Cannar Oils, Ltd., is being formed to take over the whole activities of the Canadian National Railways in the Vermilion field, with J. M. Penny of the C.N.R. as president. Light rotary outfits will likely be used, such equipment being capable of drilling the necessary 1,800-ft. hole inside 15 days' rigging and drilling time. From 2 to 5 outfits will be operated simultaneously.

Operations will include the processing and conditioning of the heavy crude for fuel-oil purposes. Experiments have been conducted with a simplified process of separating the water and silt at the well head; but it is likely that arrangements will be made to take over and expand the existing processing plant at Borrodaile, with possibly the installation of new equipment designed to reduce operating costs.

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The other side of the Selectograf gives outer race data when slide is set to the inner race o.d. or shaft diameter. Engineers and designers may obtain the Selectograf free of charge by request on their business letter head to Bantam Bearings Corp., South Bend, Ind.

Cardox Corp. Exhibits Liquid Carbon Dioxide at Exposition

Petroleum engineers actually saw liquid carbon dioxide on public display for the very first time when they visited the Cardox Corp. exhibit at the thirty-first annual Safety Congress and Exposition in Chicago. The liquid carbon dioxide was contained in a min-

iature, mechanically refrigerated storage tank of about 30-lb. capacity, specially built for the exposition. For the usual all-steel construction thick transparent plastic ends were substituted on the tank, which in all other ways closely followed the engineering principles incorporated by Cardox in the storage vessels of its full-sized fire-extinguishing systems.

Seen through this transparent plastic, the liquid carbon dioxide looked very much like water. Where it was in contact with the sides and bottom of the vessel, slight evidence of heat input could be seen in the tiny bubbles which rose to the surface of the liquid, only to be recondensed as the carbon dioxide vapor in the upper portion of the tank came into contact with the refrigerating coils, forming drops which fell back into the liquid CO_2.

This visual observation of liquid carbon dioxide was made possible by the Cardox method in which liquid carbon dioxide is stored in mechanically refrigerated pressure vessels at 0° F., with a resulting relatively low pressure of 300 lb. Carbon dioxide handled in this way has such enhanced fire-extinguishing values as uniformity of fire-extinguishing performance through controlled temperature, and greatly increased cooling capacity as a result of higher yield of carbon dioxide snow ("dry ice") from the low-temperature liquid. Another feature is the accurate projection of a mass discharge over longer distances and through comparatively strong crosscurrents of air.

Supply Firm Reorganized

A plan of reorganization of Drillers Supply Co. and Southern Supply Co., Inc., has been announced by Ted A. Chapman, president of the two concerns, both of Wichita, Kans. Effective as of December 1, all business and contracts of both companies will be carried out and handled under the name Southern Supply, Inc., with general offices at 401 North Water Street. The directors of Southern Supply, Inc., are Ted A. Chapman, Fred M. Chapman and D. O. Metz.

Officers of the company are Ted A. Chapman, president; Fred M. Chapman, vice president and general manager, and T. A. Howell, secretary-treasurer. The company is engaged in the refinery supply, oil-field supply and industrial supply business, and is furnishing requirements for war-plant industries.

AMONG EQUIPMENT MEN

Management Group Named By Guiberson Corp.

Directors of Guiberson Corp. and Guiberson Diesel Engine Co. of Dallas, Tex., manufacturers of oil-field equipment, Army Ordnance material, air-cooled diesel engines for aircraft, tanks and boats, shells for Chemical Warfare Service, and subcontractors to the aviation industry, have elected a management committee to direct expanding operations of the two corporations.

Members are Harry S. Zane, Jr., vice president of the firms and manager of their Chicago office since 1940, chairman; Allen Guiberson, president of Guiberson Corp. and executive vice president of Guiberson Diesel Engine Co., who was in charge of perfecting the Guiberson air-cooled radial diesel aircraft engine; Alex P. Smith, vice president and controller; and R. D. Wallis, secretary and treasurer.

Allen Guiberson is chairman of the Texas section of the Society of Automotive Engineers.

S. A. Guiberson, Jr., founder of the business, and N. G. Guiberson, vice president, are ex officio members of the management committee.

Kobe Announces Advancement Of Rader and Browning

C. M. Rader has been advanced to assistant general manager, and H. K. Browning has been advanced to general sales manager of Kobe, Inc. In making this

C. M. RADER

H. K. BROWNING

announcement, J. C. Coberly, president and general manager, said these changes were made to meet the increasing demands of the company's business due to its war contracts and rapidly spreading use of the company's hydraulic pumping system for the production of crude oil essential to the war effort.

Mr. Rader, formerly general sales manager, will as assistant general manager be responsible for all hydraulic-pump and perforated-pipe activities of the company, and will continue his headquarters in Huntington Park, Calif. Mr. Rader was graduated from the University of Minnesota's school of civil engineering and immediately entered the officer's training course at Fort Snelling, Minn., and later served with the Twentieth Engineers in France during 1917 and 1918. In 1937 Mr. Rader, having become thoroughly interested in the possibilities of hydraulic oil-well pumping, joined Kobe, Inc., as Mid-Continent division manager, which position he held until April of this year when he mas made general sales manager of the company and moved to Huntington Park.

Mr. Browning, as general sales manager, will have charge of all the company's sales, field and advertising activities in both the domestic and foreign markets for all products, and will headquarter in Huntington Park.

Mr. Browning joined Kobe, Inc., in 1940 as division sales manager and in April of this year replaced Mr. Rader as Mid-Continent division manager on the latter's transfer to Huntington Park as general sales manager.

G. M. Stewart, W. K. M. Export Manager, Commissioned a Captain

G. M. Stewart, for the past several years export manager for W. K. M. Co., New York City, has been commissioned as a captain in the Ordnance Department of the Army, and will receive his preliminary training at the Seneca Ordnance Depot at Romulus, N. Y. Prior to his connection with W. K. M. Co., Mr. Stewart spent several years in oil-production work in South America. He is a charter member of the New York chapter of Nomads.

Attend New York Conference

John Gieseke, Dallas, Tex., manager Mid-Continent district, and G. H. Cristen, Los Angeles, Calif., manager of California division for Crosby Steam Gage & Valve Co., were in New York City recently attending an annual engineering conference at their New York headquarters.

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25 K.W. and 40 K.W. Gas Engines, 220 volts, D.C. Two 100 K.W. Gas Engine-Generator Sets, 220 volts, D.C. 7x6 Ingersoll-Rand ER-1 Air Compressor. Six-inch Oster Pipe Threading Machine. Also large stock of lathes, pipe machines, milling machines, etc. Send for our list.

Terms to suit.

CINCINNATI MACHINERY & SUPPLY CO.
26 West 2nd St., Cincinnati, Ohio.

FOR SALE: 27½" Ideal Rotary Table, 5 sheave 200 ton Crown Block, 4 sheave 72" traveling block, 8" Ideal enclosed rotary hook. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE: At Oil Hill, Kansas, 500 8⅝" OD 10 V Thread Lap Weld used Casing Couplings, 8⅛" long. Cities Service Oil Co., Patridge, Bartlesville, Okla.

BUY AND SELL

Used Engines, Compressors, Power Plants and Gasoline Plant Equipment.

We Rebuild and Guarantee

L. F. SMITH CO.

217 W. Archer, Tulsa, Okla.

We have in stock for immediate shipment:

15 H.P., Fairbanks-Morse Oil Engine
25 H.P., Tips Oil Engines
40 H.P., Tips Convertible Engines
40 H.P., Tips Gas Engines
50 H.P. 2 cyl., Tips Oil Engine
120 H.P., 3 cyl., Tips Oil Engine

TIPS ENGINE WORKS
Austin, Texas

⅞" Oklahoma City used sucker rods, 50,000 feet, good condition. 50—10 and 12" x 23' Channels. 3—24" x 20' Beams and some short pieces, smaller sizes. Some reinforcing sucker rods, all at Oklahoma City. M. R. Travis, 1702 S. Boulder, Tulsa, Okla.

2—10,500-BBL. TANKS

2 Riveted Warren 50' dia. x 30' high steel tanks with steel roofs, aluminum painted, in excellent condition. Located Ohio. Immediately available.

L. M. STANHOPE

WAYNE. PENNA.

2—120 HP, 650 RPM, rebuilt Diesel engines, power units.
1—200 HP, 514 RPM, completely rebuilt Diesel engine, power unit.
The two above can be supplied with Generators if desired.
2—66 HP Boilers.
1—75 HP variable speed A.C. motor.
Also variable sizes small alternating current motors.

K. S. RICHARDS
P.O. Box 443, Fort Worth, Texas
Phone 3-5600

FOR SALE—A large stock of reconditioned valves and fittings suitable for refinery and pipe line service. Inquire Eason Oil Company, Enid, Okla.

FOR SALE at Oklahoma City: Ten 70-HP, 175# WP, F & T, LFB used reconditioned boilers. Cities Service Oil, Patridge, Bartlesville, Okla.

STORAGE TANKS

1—55,000 bbl. All Steel Riveted—6 Ring
1—55,000 bbl. All Steel Riveted—5 Ring

OFFERED FOR IMMEDIATE SALE, LOCATED IN OKLAHOMA. WIRE—PHONE—WRITE

HORWITZ PIPE & SUPPLY CO.

65 North Madison, Phone 2-9128
Tulsa, Okla.

FOR SALE: Complete Wilson Portable Rotary Rig with telescoping mast, suitable for 2,000 ft. drilling. Melton Machinery & Supply Co., Seminole, Okla.

STEEL TANKS

2—6000 Gal. R.R. Car Tanks
4—17,300 Gal. 10'x29'6" horizontal.
2—20,150 Gal. 11'x28'6" horizontal.
220,000 Gal. 43'x20' Vertical

L. M. STANHOPE
Wayne, Penna.

ALL TYPES and sizes guaranteed used Valves, 2 million Fire Bricks, large assortment Structural Steel, Water Tube and other type Boilers, Industrial Equipment of any type. Steel Buildings.

Industrial Supply & Equipment Co., Inc.
338 Baronne St., New Orleans, La.
RAymond 0889

DIESEL—GAS—ENGINES

Large selection — All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—boilers, steam engines, and turbo-generator sets.

Complete information on request.

A. G. SCHOONMAKER COMPANY
48 Church Street, New York, N. Y.

FOR SALE: Star Mfg. Company, portable cooling tower, telescoping type, 7' wide, 13' long, 8' high. All steel. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE—Three 15 x 10 and one 12 x 10 Pneumatic Compressors less motors or power units. In excellent condition, suitable for low pressure service. Inquire Eason Oil Company, Enid, Okla.

REFINERY EQUIPMENT FOR SALE

Two return tube stills, 2000 bbl. capacity. Three bubble towers, 2000 to 4000 capacity, cast iron trays, 45 to 65 feet high. Three flash towers. Two return tube boilers, 100 h.p., 125 working pressure. Two treating towers 4'x12'. One kerosene agitator complete, 450 bbl. capacity. Lot misc. gate and manifold valves. Ten small steam pumps. Two Brown recorders, temperature and pressure. One T.A.D. thermostat control with valves. One drum head, 150 lb. pressure, 60,000 gals. horizontal welded tank. One vertical 11'x15' steel ¼" riveted tank, 10,000 gals. Reflux condensers, tube shell and return tube water tower cooled condensers. Equipment located in Illinois.

FALLS CITY SALES COMPANY
Box 776, Louisville, Kentucky

9100' 4½" O.D. 16.60#

Grade D API Seamless Internal Upset Drill Pipe, Range 2 with Hughes Acme Streamline Tool Joints bucked on but not welded; in good condition. Located at Corpus Christi, Texas.

4847' 4½" O.D. 18.10#

Grade D Seamless External Upset Internal Flush Drill Pipe, Range 2 with Hydril Internal Flush Tool Joints attached. In good condition. Located in Houston, Texas.

15,000' 3½" O.D. 13.30#

API Seamless. Range 2 Drill Pipe with Hinderliter and Hughes Tool Joints. Located in West Texas. In good condition.

Box B-390, The Oil and Gas Journal
Tulsa, Okla.

FOR SALE

2—Calciners, 5' diameter x 40' long. Brick-lined throughout. Complete with necessary auxiliary equipment as, quench tanks, water leveling tanks for quench tanks, and various feeding devices with a three-story bucket elevator, gas compressor with 10-HP motor, and Reeves Speed Reducer. Good condition.
2—Hardinge mills, 8' x 3', conical type, complete with motors, bull gears, and everything necesary to put mill in operation. Silax lining, but no pebbles. Mills are wet grinding type; operate at 24 RPM with a slip ring motor. Capacity 50 to 60 tons for 24 hours. Good condition.
2—Dorr Classifiers, wet type. 2'3" wide x 14' long, slope 2" to 3½". Complete with motor. One Classifier has double rake; the other, single rake.
1—Lithopone Tunnel Kiln. Built on steel frame and covered with transite. 2-tunnel type with steam coil banks for heating element. Trucks are served with steel enameled covered trays. Complete with 101 steel trucks.

Box B-398, The Oil and Gas Journal,
Tulsa, Okla.

FOR SALE—Two Cardwell model RL double drum well servicing units with spudder attachments complete with wire lines, light plants, cable tools and tool houses. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE: 3000 pcs. 3" and 500 pcs. 4" Line Pipe Cplgs. Also large stock large size casg. cplgs. New and perfect. JULIUS M. FOGELMAN, Reading, Penn.

FOR SALE: At Oil Hill, Kansas, one carload ⅝" Junk Sucker Rods, and at Oklahoma City one carload ¾" Junk Sucker Rods. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE—One partial list steam rotary equipment less boilers, rotary table, traveling block, swivel, located near Coyle, Oklahoma, priced right to sell. Inquire T. T. Eason and Company, Enid, Okla.

FOR SALE: 1—18' band wheel power; 6 No. 3 OK jacks complete and one 1500 watt Kohler plant; also, drilling bits stems and jars, Butler County, Kansas. Box B-366, The Oil and Gas Journal, Tulsa, Okla.

SPECIAL OFFER
IMMEDIATE SHIPMENT

OXYGEN-ACETYLENE WELDING HOSE SETS

Guaranteed—Heavy Duty
Standard Size—Double Braid

Samples furnished on request

Each set consists of OXYGEN hose (BLACK) and ACETYLENE hose (RED) with standard brass couplings attached to fit all makes of torches and gauges.

Length set	*Price per set*
12½ Ft. set	$ 3.10
25 Ft. set	5.80
50 Ft. set	10.80
75 Ft. set	15.80
100 Ft. set	20.80
Connector set	.30

Hose also furnished in continuous length reels of approximately 250 ft. and 500 ft. lengths.

OXYGEN HOSE	10c per ft.
ACETYLENE HOSE	10c per ft.
STANDARD COUPLINGS	15c each

Prices net—F.O.B. New York

CARLYLE RUBBER CO., Inc.
62 Park Place New York, N. Y.

FOR SALE—One complete steam rotary outfit less boilers, located near Coyle, Oklahoma, priced to sell. Inquire T. T. Eason and Company, Enid, Okla.

FOR SALE: 4—40 H.P. Superior 'Two Cycle' Gas Engines with reversible clutches. Good condition.
1—40 H.P. Fairbanks-Morse Diesel Engine. Vertical, type VA Model 32, with starting equipment. Good condition.

STROUBE & STROUBE
Corsicana, Texas

FOR SALE: 2 Westinghouse electric pumping and drilling units complete. 15/35 motors, Dodge power take-offs, all pulleys. $750.00 for the lot F.O.B. Harry Sharp, Abilene, Texas.

FOR SALE: Three 100 h.p. Superior engines, with class B McCord lubricators at $2500.00 each. One Goulds pump $1200.00. Four 4x12 V.T.P.P. National Transit pumps. Write or wire PIPE AND MINING SUPPLY CO., 3063 Brighton Blvd., Denver, Colo.

FOR SALE: Kirk-Morrow steel ring front, drilling gates, sheaves, belts, pipe fittings, etc. Private owner closing out. Leonard Smith, 1526 N.E. 19th, Phone 5-0841, Oklahoma City, Okla.

TANKS FOR SALE

220,000 gal. 43' x 20' Steel Tank. 1—14,000 gal. and 2—11,000 gal. and 1—8,000 gal. Steel Tanks. 12—9' x 8' Wood Tanks 2—10,500 bbl. 50' x 30' steel tanks with steel roofs.

L. M. STANHOPE
Wayne, Penna.

FOR SALE—Approx. 6500 ft. 6⅝" OD 25.20# drill pipe with Reed Full Hole Shrink Grip Tool Joints, A-1 condition. Inquire T. T. Eason and Company, Enid, Okla.

Journalisms;

PRODUCTION is being maintained in the Wilcox zone at Oklahoma City by a systematic program of sidetracking and redrilling of old wells. The fact that these wells find good production within the confines of small leases is of considerable importance to producers in fields having declining production. The cost of such a program is much less than the redrilling of the field from the surface. Practices such as this may result in a wholesale upward revision of the nation's reserves in old fields and as this additional output can be obtained quickly and with a minimum of material, it may prove of great importance during the war period. Next week's Journal will carry an account of the methods employed and the results achieved in the Oklahoma City field.

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PARALLELING this development is the redrilling of old fields, particularly in California, in order to increase the output of heavy oil so urgently needed in that state. This activity is reported weekly in the Journal's Field Development Section.

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WITHIN recent months, there has been developed in the pipe-line industry a method of pressure welding which saves time and costs in the construction of pipe lines. The Journal's Engineering and Operating Section next week will carry an article on this new development which will be plentifully illustrated to show how the method is used.

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WITH stripper-well producers depressed by mounting costs and a fixed price for their oil, it is increasingly necessary for them to analyze their present operations in order to eliminate uneconomic procedures. Felix B. Gordon, formerly district superintendent for Buffalo Oil Co. and now a second lieutenant in the Ordnance Corps, prepared a timely article on the subject which will appear in next week's issue. In his letter accompanying the manuscript. Lieutenant Gordon states that the data were obtained from actual operations in South Texas and that the paper presents a conclusive method of differentiating between low efficiency of pumps due to defective equipment or to the inability of the well to produce. He also discusses the effect of changing the level of the pump on production.

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IT is always pleasant to receive comments from our readers, but naturally it is more gratifying when they are complimentary. The letters that have come in following the publication of our Rubber-from-Petroleum issue of November 26 have been particularly welcome. Several readers have observed that they liked the succession of articles in a logical order so that the issue could be read through as a textbook. One of the country's leading technological chemists says that the issue was "a masterly job on a difficult subject." The research director of one of the largest independent natural-gas and gasoline companies is particularly pleased with the article dealing with chemical materials used in rubber manufacture. Most of the letters contain requests for additional copies of the issue, a limited number of which are still available.

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WITH rationing of motor fuel and increase in the production of high-octane gasoline, reduction in the output of furnace oils, and an increased demand for heavy fuels, refiners are learning much about flexibility of operations these days. In some cases higher priced products are giving place to those whose price is below that of crude, so that the total yield from a barrel of crude is diminished while the cost of refining that barrel is increased. Special products entering into elastomers and chemicals complicate the picture still farther. In their coverage of the industry, the Journal's editorial staff is learning much about these changes and their effect on the manufacturing end of the oil business. This will soon be passed on to our readers.

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THE flexibility of today's refinery operations has a decided effect on the producer. "Mid-Continent 36° crude" does not mean what it used to and the particular properties of individual crudes may create or diminish the demand for them. This may necessitate a complete revision of the price structure. Some heavy crudes which have brought a low price in the past are now in great demand and under normal conditions the prices on these oils would have advanced. This situation will be dealt with in future articles in the Journal.

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CALENDAR

December

OKLAHOMA MINERAL INDUSTRIES CONFERENCE, Oklahoma City, Okla., December 10.

WESTERN PETROLEUM REFINERS ASSOCIATION, special technical group meeting, New Caddo Hotel, Shreveport, La., December 11

MID-CONTINENT OIL AND GAS ASSOCIATION, annual meeting of board of directors, Tulsa Club, Tulsa, December 17.

PETROLEUM ACCOUNTANTS SOCIETY OF OKLAHOMA, Hotel Mayo, Tulsa, December 17.

INTERSTATE OIL COMPACT COMMISSION, annual organization meeting, Biltmore Hotel, Oklahoma City, Okla., December 18-19.

1943

February

NATIONAL OIL SCOUTS AND LANDMEN'S ASSOCIATION, business session, Dallas, Tex., February 4, 1943.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, New York, February 15-18, 1943.

April

AMERICAN PETROLEUM INSTITUTE, Division of Production, Eastern district, William Penn Hotel, Pittsburgh, Pa., April 8-9, 1943.

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, annual meeting, Fort Worth, Tex., April 7-9.

May

PETROLEUM INDUSTRY ELECTRICAL ASSOCIATION, annual meeting, Houston, Tex., May 5-6, 1943.